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TALKING ABOUT HER(SELF): AMBIGUITY AVOIDANCE AND PRINCIPLE B. A Theoretical and Psycholinguistic Investigation of Romanian Pronouns

Rudmila-Rodica Ivan
UMass Amherst

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AMBIGUITY AVOIDANCE AND PRINCIPLE B

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A Dissertation Presented

by

RUDMILA-RODICA IVAN

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Approved as to style and content by:

Brian Dillon, Co-Chair

Kyle Johnson, Co-Chair

Lyn Frazier, Member

Adrian Staub, Member

Marcel den Dikken, Member

Joe Pater, Department Chair
Department of Linguistics

To Luna, Snape, Hermione,

and Dumbledore.

So it goes.

— KURT VONNEGUT

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[1]You can see some of Tran's art here: `https://www.behance.net/tranttbui/` and `https://www.instagram.com/tranttbui/`.

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ABSTRACT

TALKING ABOUT HER(SELF):

AMBIGUITY AVOIDANCE AND PRINCIPLE B

A THEORETICAL AND PSYCHOLINGUISTIC INVESTIGATION OF ROMANIAN PRONOUNS

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RUDMILA-RODICA IVAN

B.A., UNIVERSITY OF BUCHAREST

M.A., UNIVERSITY OF BUCHAREST

Ph.D., UNIVERSITY OF MASSACHUSETTS AMHERST

Directed by: Professor Kyle Johnson and Professor Brian Dillon

This dissertation answers a deceivingly simple question: why can *her* in *Hermione talked about her* refer to the sentence subject in Romanian, but not in English? The Romanian facts, which are surprising for both classic and competition-based accounts of the *Binding Theory* over the last 40 odd years, bring us to the following overarching question: what are the constraints on pronominal reference? To address these main questions, I carry out a psycholinguistic investigation of Romanian pronouns and argue that the distribution and interpretation of pronominal forms is *jointly* determined by pragmatic and morphosyntactic constraints.

I discuss evidence from four experiments, two on language production and two on language comprehension, which focus on intrasentential pronominal reference. I provide an overview of previous Binding Theory accounts, both classic and competition derived, and, based on English data, I define the *terms of competition* of pronominal forms and then show how a pragmatic constraint I propose, BE CLEAR!, can account for Condition B effects for both English pronouns, as well as for Romanian clitic pronouns.

The two production experiments in Romanian bridge the theoretical and psycholinguistic literatures by extending ambiguity avoidance studies to the intrasentential domain. These experiments also provide evidence that BE CLEAR! is active in both coreference and bound variable contexts, in contradiction to previous seminal accounts in the *Binding Theory* literature. Lastly, based on the production data, I refine the proposal and introduce the syntactic economy constraint BE SMALL!.

The data from the comprehension studies show that complex reflexives like and regular pronouns do compete, contrary to existing assumptions of syntactic economy based competition accounts of Condition B effects. Furthermore, the comprehension data also serves as evidence against accounts which claim that there is a processing advantage of bound variable logical forms, as well as evidence against purely pragmatic accounts of disjoint reference.

Instead of divorcing pragmatic and syntactic competition based approaches, which is often the case in the literature, I propose, by virtue of the experimental data, that pragmatic and morphosyntactic considerations are both responsible for what we typically refer to as Condition B effects.

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LIST OF ABBREVIATIONS

1ST	=	first person
2ND	=	second person
3RD	=	third person
ACC	=	Accusative case
AGR	=	agreement
CL	=	clitic
DAT	=	Dative case
DEF	=	definite determiner
DEM	=	demonstrative pronoun
FEM	=	feminine
LOC	=	locative
MASC	=	masculine
OBL	=	Oblique case
PL	=	plural
POSS	=	possessive
PROG	=	progressive
REFL	=	reflexive
SE	=	standard error
SELF	=	self pronoun
SG	=	singular
ToC	=	*Terms of Competition*

CHAPTER 1

INTRODUCTION

One of the most fascinating aspects of language has to do with how speakers achieve and understand *reference*. It is unsurprising, then, that this has been a topic of great interest for theoretical linguistic frameworks for over 130 years, ever since Frege (1892) and Russell (1905)'s seminal works. Following the advent of Chomsky (1957)'s *Syntactic Structures*, in the spirit of generative grammar, the question then becomes: what are the syntactic and semantic constraints on reference? On this note, a substantial deal of research turns to the referential dependencies between noun phrases, and to anaphoric and pronominal reference in particular. What accounts for the distribution of anaphors, such as *himself* and *each other*, and pronouns, like *him*, and how is their interpretation achieved?

When we say something like *Hermione talked about...*, as speakers and hearers we are aware that Hermione could be talking about any salient or relevant referent in the discourse. The sentences in (1), by virtue of the gender of the pronoun *her* and *ea*, restrict the set of relevant discourse referents to those who identify as female in our context. At this point, our task is to figure out who *her* refers to. In theory, it could be any of the salient female referents in this context: Hermione is perhaps talking about Luna, Tonks, McGonnagal, Bellatrix Lestrange, etc. However, can the sentences in (1) mean that Hermione is talking about Hermione?

(1) a. Hermione talked about her. ENGLISH

b. *Hermione a vorbit despre ea.* ROMANIAN

Hermione has talked about her
'Hermione talked about her(self.)'

Native speakers of English will more than likely interpret *her* in (1a) as disjoint in reference from the sentence subject: Hermione is talking about someone else. Native speakers of Romanian, however, judging the equivalent (1b), also allow for a reading where Hermione is talking about herself. Herein lies the puzzle addressed in this dissertation. Why can *her* refer to the sentence subject, Hermione, in the Romanian (1b), but not in the English (1a)? This question is couched in a larger, more generic inquiry, which concerns cross-linguistic constraints on pronominal reference. In answering these questions, in this dissertation, I argue that the distribution and interpretation of pronominal forms is *jointly* determined by pragmatic and morphosyntactic constraints.

As linguists, when we think about constraints on pronominal reference, we turn to Chomsky (1981)'s *Binding Theory*, and more specifically, to *Principle B*, or *Condition B*. This constraint, in its various formulations, states that a pronoun must be free in its binding domain. In the case of our simple sentence, in (1a), *Condition B* prevents her from being bound by Hermione. This captures the fact that, in English, this sentence cannot have a reflexive reading. However, the Romanian (1b) is a direct counterexample to this constraint, as are many other languages, like Frisian (Everaert, 1986), and, more recently, Khanty (Volkova & Reuland, 2014), Jambi (Cole et al., 2017), and Chamorro (Wagers et al., 2018).

In the Binding Theory literature, there are two main approaches: *Classic Binding Theory*, which we succinctly reviewed above, and competition based accounts. The latter propose that disjoint reference effects for pronouns can be obtained by virtue of regular pronouns like *him* competing with reflexive pronouns like *himself.*

There are a number of different ways of approaching this competition. For some accounts, *Condition B* is no longer assumed, but derived. Accounts like Levinson (1987)'s, starting with a suggestion made by Dowty (1980) in a reply to Bach & Partee (1980), claim that *Condition B* effects are obtained via pronominal competition due to reflexives like *herself* being *less ambiguous* than regular pronouns like *her*. There are also accounts like Safir (2004, 2014) and Rooryck & vanden Wyngaerd (2011), which claim that reflexive pronouns are *more economical* than their regular pronoun counterparts. There are various ways of achieving this economical consideration, with a general assumption being that reflexive pronouns are minimal pronouns, along the likes of Kratzer (2009). There are also economy competition based accounts which still assume some form of *Condition B*. These include accounts like Reinhart (1983a, 2006) and Roelofsen (2010), which are inspired by pragmatic reasoning, and accounts like Reuland (2001, 2011), which make more direct assumptions regarding processing. The core hypothesis here is that *binding relations* are more economical than *coreference*.

Despite the existence of such varied approaches of *Condition B* effects, which I overview in great detail in *Chapter 2*, none of these accounts can capture the Romanian data, where, as illustrated in (1b), regular pronouns are ambiguous between reflexive and disjoint reference readings. The ambiguity of regular pronouns like *ea* is especially surprising given the fact that this language does not lack reflexive anaphora, as shown below.

(2) a. *Hermione a vorbit despre ea însăşi.*

Hermione has talked about her herself
'Hermione talked about herself.'

b. *Hermione a vorbit despre sine.*

Hermione has talked about self
'Hermione talked about herself.'

In fact, in the competition-based theoretical literature, the expectation is that regular pronouns should give rise to *Condition B* effects in syntactic contexts where reflexives are available (Rooryck & vanden Wyngaerd, 2011). The availability of a reflexive reading for a sentence like (1b) then, where the pronoun *ea* 'her' is used, is unexpected, since Romanian also makes use of unambiguously reflexive expressions like the emphatic complex reflexive *ea însăşi* 'her herself' as in (2a) or the simplex reflexive *sine* 'self', as in (2b). This brings us to another core question addressed in this dissertation, namely, how do Romanian speakers choose between these various forms?

In what follows, I discuss evidence from four NSF DDRI funded experiments[1], two on language production and two on language comprehension, which investigate intrasentential pronominal reference in Romanian. In *Chapter 2*, I provide an overview of previous *Binding Theory* accounts, both classic and competition-based. Following a review of the English data, I define the TERMS OF COMPETITION of pronominal forms and then show how a pragmatic constraint I propose, namely BE CLEAR!, can account for *Condition B* effects for English pronouns, as well as for Romanian pronominal clitics. Finally, I discuss the outstanding puzzle posed by the distribution and interpretation of Romanian pronouns.

In *Chapter 3*, I discuss the data from the two production experiments. These studies bridge the theoretical and psycholinguistic literatures by extending psycholinguistic research on the effect of ambiguity avoidance on the choice of referring expressions to the intrasentential domain, as well as provide evidence that BE CLEAR! is active in both coreference and bound variable contexts. Crucially, the two experiments show that, contrary to accounts like Reinhart (1983a) and Roelofsen (2010), a pragmatic constraint impacts the choice of referring expressions for bound variables. Lastly, based on the production data, I further refine the proposal

[1] `https://www.nsf.gov/awardsearch/showAward?AWD_ID=1823686`

and introduce the syntactic economy constraint BE SMALL!, which I argue is active in both English and Romanian.

In *Chapter 4*, I discuss the data from the comprehension study counterparts of the production experiments in *Chapter 3*. These experiments provide evidence that complex emphatic reflexives like *ea însăşi* 'her herself' and regular pronouns like *ea* 'her' do compete, contrary to the assumptions of Safir (2004, 2014) and Rooryck & vanden Wyngaerd (2011). Furthermore, the comprehension data also serves as evidence against accounts like Reuland (2001, 2011) which claim that there is a processing advantage of bound variable logical forms, as well as evidence against purely pragmatic accounts like Levinson (1987, 2000). In fact, as discussed in this chapter, the comprehension data is most compatible with a probabilistic inferencing account, whereby the comprehension data is a function of the production data discussed in *Chapter 3*.

Lastly, after the concluding remarks, in the appendix, I discuss one particular account in great detail, namely Rooryck & vanden Wyngaerd (2011), and I note the flaws of their account for French and German, provide amendments to the German account and also discuss the impossibility of extending such an account to languages like Romanian.

The goal of this dissertation is not to show the failings of previous approaches to the *Binding Theory*, but to highlight how competing accounts can be merged to successfully capture otherwise puzzling data. I argue that the distribution and interpretation of pronouns, as well as cross-linguistic binding and pronominal referential patterns, can be accounted for by more generic pragmatic and economy based constraints, as illustrated by the experimental data collected on Romanian, instead of stipulated interpretation specific grammatical principles.

CHAPTER 2

THEORETICAL AND EMPIRICAL BACKGROUND

As Reinhart (1983a) puts it, anaphora represents a central issue in linguistic theory, and a test case for competing hypotheses concerning the relations between syntax, semantics and pragmatics. While, prior to the advent of Chomsky (1981)'s *Binding Theory*, most research focused on the syntax of anaphors and pronouns (Lakoff, 1968; Langacker, 1969; Chomsky, 1973; Lasnik, 1976; Reinhart, 1976), there had also been computational work on general heuristics for establishing anaphor-antecedent relations (Winograd, 1972), on the use of inference for anaphoric resolution (Rieger, 1974; Hobbs, 1976), as well as the effect of discourse (coherence) relations on pronominal interpretation (Grosz, 1977; Reichman, 1978; Webber, 1978).

In the syntactic literature, the aim is to capture the distribution of anaphors like *himself* and pronouns like *him* in sentences like (3), below. One interpretation of (3c), for instance, is that of *coreference* between *Lockhart* and *him*: the two determiner phrases (DPs) refer to the same entity, *Lockhart*. The same sentence also has a *disjoint reference* reading, where the two DPs refer to separate entitites in the discourse (*Lockhart's student charmed someone else*).

(3) a. Lockhart charmed *himself*.

b. Lockhart charmed *him.*

c. Lockhart's student charmed *him.*

d. Lockhart's student charmed *himself*.

Furthermore, there are also instances of seemingly *obligatory* cases of coreference and disjoint reference (Chomsky, 1973). In (3a), the reflexive *himself* is necessarily coreferent with *Lockhart*, while the strongly preferred interpretation of the pronoun *him* in (3b) is that of disjoint reference with *Lockhart*. The interpretative differences between (3c) and (3d), in the latter *himself* being obligatorily coreferent with *student*, and (3c) and (3b), where *him* can refer to the subject of the genitive construction but not to the local sentence subject, teach us that syntactic configurations can also play a role in the interpretation of pronouns and anaphors.

2.1 Reinhart's Binding Building Blocks

Building on these observations and on previous work by Klima (1964), Lakoff (1968), Langacker (1969), and Chomsky (1973), Reinhart (1976) indentifies *c-command* as a key ingredient in establishing pronominal and anaphoric reference. The definition of c-command, as proposed by Reinhart (1976) is given below. [1]

(4) C-COMMAND

Node A c(onstituent)-commands node B if neither A nor B dominates the other and the first branching node which dominates A dominates B.

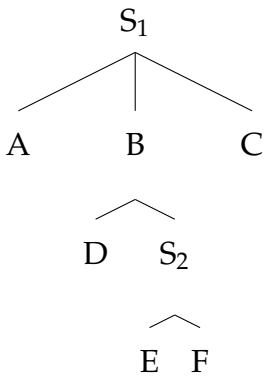
Reinhart (1976, ex. (36), p. 32)

[1] While the notion of *command* had been a part of linguistic theory since Langacker (1969), *c(onstituent)-command* is first proposed by Reinhart (1976). Langacker (1969)'s definition of *command* is given below.

(i) COMMAND
A node A commands a node B if neither A nor B dominates the other and the S node most immediately dominating A also dominates B.

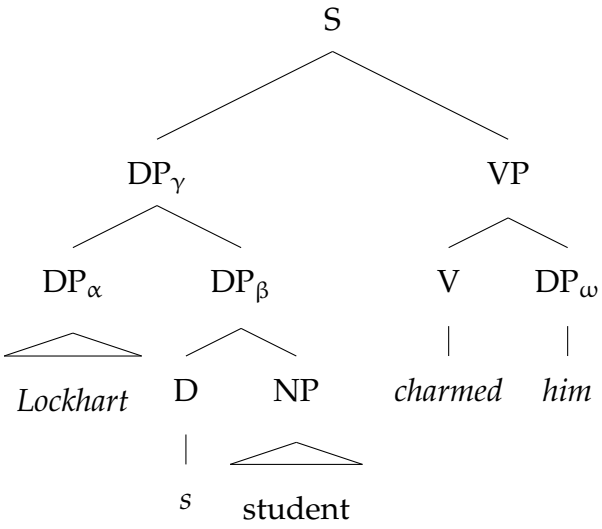
Langacker (1969, p. 167)

(5) *Sample Derivation*

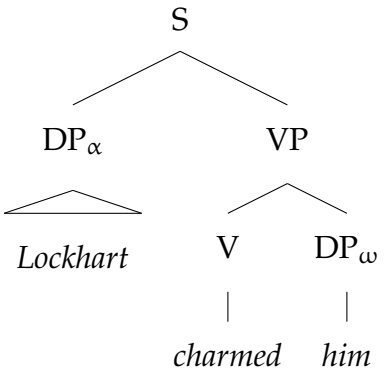


In the derivation on the left, nodes A and C both c-command every other node under S_1. D does not c-command C, since the first branching node which dominates D (namely B) does not dominate C. Reinhart (1976)'s c-command also distinguishes between the two sentences in (3c) and (3d), associated with the derivations in (6) below.

(6) a. *Lockhart's student charmed him.*



b. *Lockhart charmed him.*



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DP_α only c-commands DP_ω in (6b): the first branching node dominating DP_α, S, also dominates DP_ω. In (6a), the first branching node which dominates DP_α is DP_γ, which does not dominate DP_ω, and hence, *Lockhart* does not c-command *him* in (6a), but does so in (6b).

The derivations above teach us that pronouns must be disjoint from c-commanding DPs within the same sentence. Furthermore, by replacing *him* with *himself* in the derivations above, the observation is that anaphors can corefer only with DPs that c-command them, since *himself* could only be bound by *Lockhart* in the equivalent of (6b).

Although the building blocks of formulating precise syntactic constraints on reference represent the fruits of labor of many different accounts (Lakoff, 1968; Langacker, 1969; Chomsky, 1973; Lasnik, 1976; Reinhart, 1976, a.o.), the most famous and well-cited instantiations of these constraints are those of Chomsky (1981) and Chomsky (1986), often referred to in the literature as *Classic Binding Theory*. One main ingredient of this seminal account of reference relations concerns *indexation*.

The indexation of determiner phrases, as introduced in Chomsky (1965), is a syntactic procedure, blind to interpretation. In this sense, indices are assumed to be mere formal indicators, with no semantic import, which serve the purpose of keeping track of movement and reference relations of their own. When two DPs refer to the same referent, these DPs are marked as *coindexed*, as in (7a) below, where *Lockhart* and *him* both bear the index 1. Notice that coindexation can occur between DPs which do not c-command each other as in (7a), or between DPs in a c-command relation, as in (7b), where *Lockhart's student* and *himself* refer to the same individual, say Harry. When DPs refer to different entities, as in (7c), where *Lockhart's student* charmed someone else, they are *contra-indexed*: the values of these indices differ.

(7) a. **[Lockhart$_1$**'s student]$_2$ charmed **him$_1$**. COREFERENCE

b. **[Lockhart$_1$'s student]$_2$** charmed **himself$_2$.** BINDING

c. [Lockhart$_1$'s student]$_2$ charmed him$_3$. DISJOINT REFERENCE

Another key ingredient in Chomsky (1981)'s *Binding Theory* concerns *syntactic binding*, the definition of which is given in (8) below.

(8) *Syntactic Binding*

A node α binds a node β iff

(i) α c-commands β,

(ii) α and β are coindexed. (Chomsky, 1981, p. 59)

According to (8), a syntactic binding relation between two nodes can only hold if two conditions are met: one node c-commands the other (Reinhart, 1976)[2], and they are *coindexed*. In the set of examples above, while (7a) and (7b) both involve coindexation, only (7b) involves a syntactic binding relation: *Lockhart's student* c-commands *himself*, and *Lockhart's student* and *himself* are coindexed, hence, according to the definition in (8), *Lockhart's student* binds *himself*. In (7a), however, *Lockhart* does not c-command *him*, as illustrated in the derivation (6a) above, so *Lockhart* does not syntactically bind *him*. In this case, *Lockhart* and *him* are, as we will see, merely in a coreference relation. In essence, while *c-command* is a necessary condition for syntactic binding, coindexing and coreference do not require *c-command*.

Following the definition in (8), the sentences below also involve syntactic binding relations. In (9a) and (9b), both *Hermione* and *no witch* c-command and are coindexed with the pronoun *she*. The two conditions of (8) are met, hence *Hermione* and *no witch* syntactically bind *she* in their respective sentences.

[2]See Bruening (2014) for arguments that *precede and (phase-)command*, and not *c-command*, is the relation required by the binding principles.

(9) a. **Hermione**$_1$ thought **she**$_1$ deserves an *Outstanding*.[3].

b. **No witch**$_1$ thought **she**$_1$ deserves an *Outstanding*.

Syntactic binding correlates with what I will call *semantic binding*, a logical relation which gives rise to bound variable readings. Among others, Engdahl (1980), Heim (1982) and Reinhart (1983a) propose ways of representing the difference between bound variables and coreference in the syntax. Following Evans (1980)[4], *bound variable interpretation* is achieved via a logical relation between an operator and a variable. To illustrate, the meaning of (9b) is that for no witch in the set of relevant witches, *that witch* thought she deserved an Outstanding; more formally, there is no x, x is a witch, such that x thought x deserved an Outstanding. On the other hand, *coreference* concerns the situation where the anaphor and another DP in the sentence have the same referential value. In (9a), *Hermione* refers to the individual Hermione, and *she* also refers to the individual Hermione. Crucially, quantified DPs, like *no witch* in (9b), may not enter a coreference relation with an anaphor, since they have no reference of their own (e.g. *no witch* does not refer to any individual in particular).

Variable binding is dependent on there being a c-command relation between the antecedent and the anaphor. In (10), where *no witch* is in the relative clause and hence does not c-command *she*, the pronoun is not interpreted as a variable bound by *no witch*. [5]

[3]The highest grade in the Wizarding World educational system.

[4]Evans (1980) distinguishes between binding proper, where a quantified expression binds a pronoun or reflexive, and coreference.

(i) *Evans (1980)'s Anaphora Conditions*

a. A pronoun can be interpreted as bound by a quantifier phrase iff it precedes and c-commands the pronoun (Evans, 1980, p. 341).

b. A pronoun can be referentially dependent upon an NP iff it does not procede and c-commands that NP (Evans, 1980, p. 358).

[5]Although generally true, there are exceptions to this observation. One such case is that of *donkey*-prononouns (Evans, 1980). In a sentence like *Every farmer [who owns a donkey] pets it*, where the

(10) *The professor [that **no witch**$_1$ liked] thought **she**$_1$ deserved an *Outstanding*.

The same observation holds for the sentences below. The pronoun *she* is outside the c-command domains of *Hermione* and *no witch*: they are in separate clauses, and, hence, not c-commanded by *Hermione* or *no witch*. Given the lack of a *c-command* relation, although coindexed, *no witch* and *Hermione* may not bind *she*. Then, the only referential relation that can be established between the coindexed *no witch* and *she*, and the coindexed *Hermione* and *she* in (11) is that of coreference.

(11) a. **Hermione**$_1$ is very clever. **She**$_1$ thought **she**$_1$ deserves an *Outstanding*.

b. * **No witch**$_1$ is clever. **She**$_1$ thought **she**$_1$ deserves an *Outstanding*.

Since coreference is not possible in (11b), the discourse is ungrammatical. As illustrated in (9b) above, quantified DPs may bind coindexed pronominal expressions within their c-command domain. On the other hand, referential DPs like *Hermione* can establish both kinds of referential relations: binding and coreference.[6] We return to this fact in *Section 2.1.2*, following the discussion of the assumptions regarding how indices will be semantically interpreted in the dissertation. In the subsection below I introduce a semantics that derives the effects described above.

quantifier is in a relative clause, as in (10), *a donkey* does not c-command the pronoun *it*, yet the interpretation is one where *it* varies with donkey-owners. Other counterexamples include Bach-Peters sentences and *paycheck* pronouns. See, among others, Bach & Partee (1980), Heim (1990), Jacobson (2000) and Elbourne (2005) for further discussion of these cases.

[6] In some accounts of reference (Reinhart, 1983a, 2006; Roelofsen, 2010), the distinction between binding and coreference is formalized via indexation. The crucial assumption is that pronouns may enter a derivation with or without an index. If a pronoun has an index, such as *him*$_1$ in (ib), the pronoun is interpreted as a variable bound by a c-commanding antecedent with a corresponding binder index. If a DP undergoes *movement*, then it receives a *binder index* which is represented as a superscript *Lockhart*^{1}, as in (ib). If a pronoun has no index, like *him* in (ia), then it is interpreted as coreferent with some antecedent.

(i) a. *Lockhart* charmed *him*. COREFERENCE

b. Lockhart^1 charmed him$_1$. BINDING

For the purposes of this dissertation, I adopt an indexation system closer to Chomsky (1986), whereby all DPs receive an index, and all indices are represented as a subscript, as in (11).

2.1.1 The Semantics of Indexation

Originally, indices were only formal indicators, with no semantic import of their own, which served the purpose of keeping track of movement and reference relations (Chomsky, 1965). However, semantic theory subscribes to the view that indices, as a part of the derivation, should be interpretable. I will here lay out the semantics for indices used in this dissertation.

I assume that the formal interpretation of indices is done via *assignment functions*. DPs of type *e* are assumed to bear indices that the assignment function *g* maps to contextually salient individuals. Cooper (1979) proposes that the ϕ-features of pronouns are presupposition triggers, which therefore constrain their interpretation. As formalized in the definition below, the pronoun she_i will be associated with the individual that the assignment function maps to the index *i* as long as this individual is female. Similarly, $Hermione_i$ will be associated with the individual that the assignment function maps to the index *i*, as long as this individual is named Hermione, as in (13) below.[7]

(12) For any assignment function *g* and for any index *i*

a. $she_i \in \text{dom}([[]]^g)$ if and only if *g(i)* is female PRESUPPOSITION

b. whenever defined, $[\![\text{she}_i]\!]^g = g(i)$ ASSIGNMENT

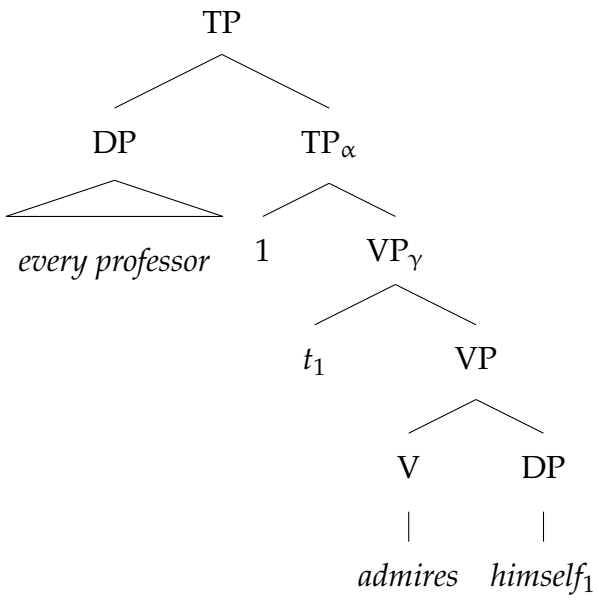
(13) For any assignment function *g* and for any index *i*

a. $Hermione_i \in \text{dom}([[]]^g)$ iff *g(i)* is named Hermione PRESUPPOSITION

b. whenever defined, $[\![\text{Hermione}_i]\!]^g = g(i)$ ASSIGNMENT

(14) *Every professor admires himself*.

[7] Contextual restriction ensures that the *Hermione* and the *female* picked out by $Hermione_i$ and she_i correspond to the unique individual relevant in the sentence context. This restriction is often encoded as a uniqueness pressuposition carried by the definite determiner which is assumed to be a semantic component of pronouns and definite descriptions (including names). See Elbourne (2005), among others, for further details.



I adopt the notion of *semantic binding*, following Heim & Kratzer (1998) and Büring (2005), whereby binding is achieved via movement. In the derivation above, *every professor* moved from the subject position of the VP to a specifier position of the TP.[8] This movement gives rise to a variable chain between the moved DP, *every professor*, its binder, which will be represented as a non-superscripted numeral, here *1*, and its trace, t_1.

The interpretation of this construction is achieved via *Predicate Abstraction*, whereby the node TP$_\alpha$ is turned into a predicate, namely a function which is interpreted under any possible assignment for the variables it contains. In the definition below, g(i/x) represents the variable assignment which maps index *i* to entity x.

(15) *Predicate Abstraction*

If α is a branching node whose daughters are β and γ, where β is a numerical index *i*, then, for any variable assignment g, $[[\alpha]]^g = \lambda x.\ [[\gamma]]^{g(i/x)}$

(adapted from Heim & Kratzer, 1998, p. 186)

[8]Evidence for subject movement, which is now assumed in syntactic and semantic theory, can be found in Koopman & Sportiche (1985), Kitagawa (1986), Speas & Fukui (1986), a.m.o. Binding from non-subject positions can be handled by assuming quantifier raising of both quantified and referential DPs, as is standard (May, 1977, 1985; Barwise & Cooper, 1981; Heim, 1993, 1998; Isac, 2006; Hackl et al., 2012, a.m.o).

Assuming that the denotation of VP_γ is $[[t_1 \text{ admires himself}_1]]^g$, since TP_α dominates the numerical index 1, by applying predicate abstraction, the denotation of TP_α becomes the one represented in (16).

(16) $[[TP_\alpha]]^g = \lambda x_e.[[t_1 \text{ admires himself}_1]]^{g(1/x)}$

In Heim & Kratzer (1998, p. 111), traces, like pronouns, are interpreted via assignment functions. Therefore, $[[t_1]]^g = g(1)$. Reflexive pronouns have the same interpretation as pronouns, so $[[\text{himself}_1]]^g = g(1)$. Similarly, $[[t_1]]^{g(1/x)} = g(1/x)(1)$, and also $[[\text{himself}_1]]^g = g(1/x)(1)$. Since $g(1/x)$ is the assignment function which maps index 1 to entity x, then the denotations of the trace and the reflexive pronoun reduce to $[[t_1]]^{g(1/x)} = x$, and $[[\text{himself}_1]]^{g(1/x)} = x$. Consequently, the denotation of TP_α and the higher node TP become those offered below.

(17) a. **$[[TP_\alpha]]^g = [\lambda x_e$. x admires x]**

b. $[[\text{every professor}]]^g = [\lambda P_{<e,t>} [\lambda y_e : \forall x.\ x \text{ is a professor} \rightarrow P(x)]]$

c. $[[TP]]^g = [[\text{every professor}]]^g([[TP_\alpha]]^g)$

d. $[[TP]]^g = [\lambda P_{<e,t>} [\lambda y_e : \forall x.\ x \text{ is a professor} \rightarrow P(x)]]([[TP_\alpha]]^g)$

e. $[[TP]]^g = [\lambda y_e : \forall x.\ x \text{ is a professor} \rightarrow [[TP_\alpha]]^g(x)]$

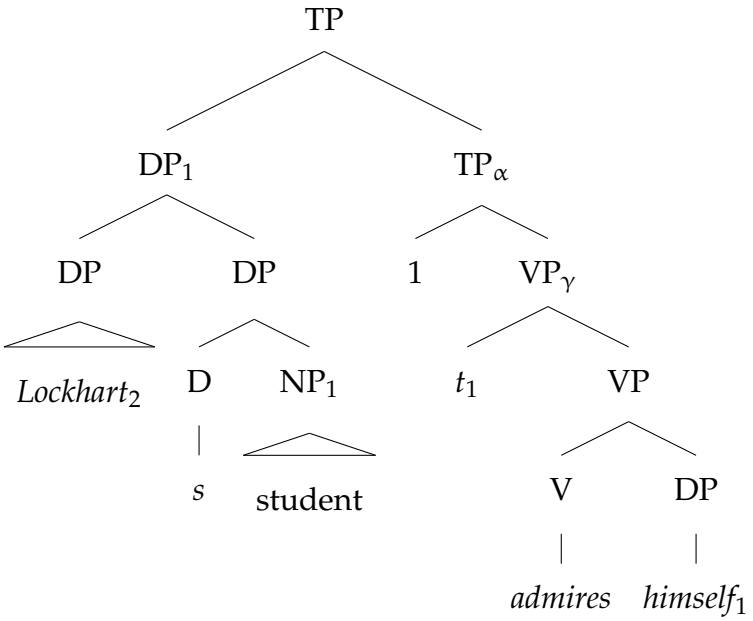
f. **$[[TP]]^g = \forall$x. x is a professor $\rightarrow$ x admires x**

As shown in (17a), TP_α is a function from entities to truth values, while *every professor*, in (17b) is a function that maps functions from entities to truth values to a function which maps entities to truth values. Following the derivation in (14), the denotation of TP is the denotation of the function *every professor* taking TP_α as an argument, as in (17c). Function application leads to the denotation in (17e). Consequently, as shown in (17f), the only available interpretation for the sentence *Every professor admires himself*, is a bound variable one.

2.1.2 Binding vs. Coreference

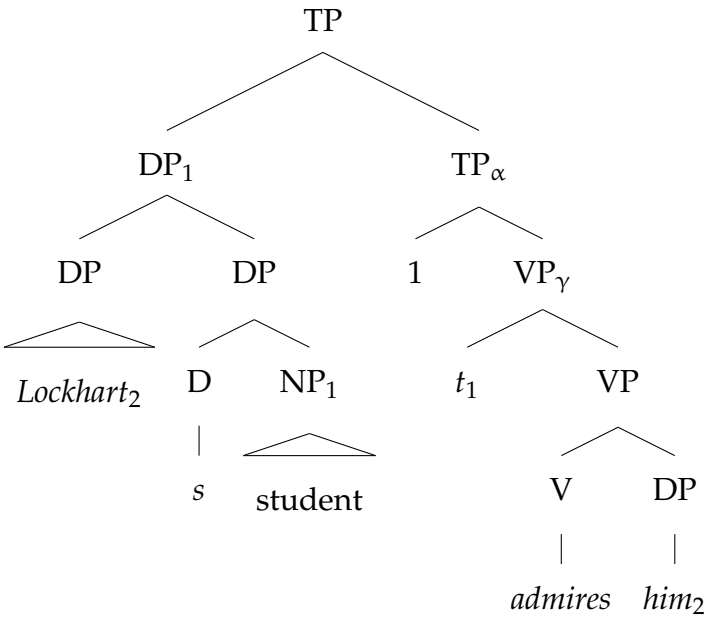
According to the indexing mechanism laid out above, the distinction between binding and coreference can be formalized in terms of λ-binding. In both LFs below, *[Lockhart's student]*$_1$ is the sentence subject and, as the subject, moves to the specifier position of TP. This movement leaves behind a trace which is bound by the subject via λ-binding. The difference between the two LFs is that in (18) the object pronominal is coindexed with the sentence subject, while in (19), the pronominal is coindexed with *Lockhart*.

(18) BINDING



In (18), the index carried by *himself* is 1, which is the same as the λ-binder index. The movement of the sentence subject, then, leads to a binding relation between *Lockhart's student*, its trace, and the anaphor *himself*. In the case of (19), however, the λ-binder index differs from the index on the pronoun, hence, a binding relation is only established between *Lockhart's student* and its trace.

(19) COREFERENCE



Let us assume that *Lockhart's student*, in the two sentences above, is *Harry*. Thus, the denotations of the two derivations above are as follows.

(20) a. BINDING

[Lockhart$_2$'s student]$_1$ [λx.[[x admires x]]] DERIVATION

g(1) [λx.[[x admires x]]] ASSIGNMENT FUNCTION

Harry [λx.[[x admires x]]] *g(1) = Harry, g(2) = Lockhart*

b. COREFERENCE

[Lockhart$_2$'s student]$_1$ [λx.[[x admires him$_2$]]] DERIVATION

g(1) [λx.[[x admires g(2)]]] ASSIGNMENT FUNCTION

Harry [λx.[[x admires Lockhart]]] *g(1) = Harry, g(2) = Lockhart*

While (20a) is interpreted as a bound variable relation, which corresponds to the interpretation that Harry admires himself, (20b) provides the reading that Harry admires the entity g(2), which, according to the assignment function g, is mapped to Lockhart; the interpretation of (20b), then, is that Harry admires Lockhart.

Now that we are equipped with this formal distinction between binding and

coreference, we can see how it leads to the subtly different interpretations of the sentence below.

(21) Hermione thinks she deserves an *Outstanding*.

a. BINDING: **Hermione**$_1$ λ_1 t_1 thinks **she**$_1$ deserves an *Outstanding*.
Hermione [λ x [x thinks x deserves an *Outstanding*]]

b. COREFERENCE: **Hermione**$_1$ λ_2 t_2 thinks **she**$_1$ deserves an *Outstanding*.
Hermione [λ x [x thinks **Hermione** deserves an *Outstanding*]]

In (21a), *she* is a variable bound by *Hermione*, and in (21b), *she* is coreferent with *Hermione*. While these two readings give rise to the same truth conditions, there is reason to believe that both exist. Evidence for the existence of the two different relations in (21) can be found in ellipsis contexts. A sentence like *Hermione thinks she deserves an Outstanding and Draco does too* has two different readings, as observed by Ross (1967). These readings are illustrated below.

(22) Hermione thinks she deserves an *Outstanding* and Draco does too.

a. Hermione [λ x [x thinks x deserves an *Outstanding*]] and
Draco [λ x [x thinks x deserves an *Outstanding*]]
Sloppy Interpretation: Draco thinks *Draco* deserves an *Outstanding*.

b. Hermione [λ x [x thinks **Hermione** deserves an *Outstanding*]] and
Draco [λ x [x thinks **Hermione** deserves an *Outstanding*]]
Strict Interpretation: Draco thinks *Hermione* deserves an *Outstanding*.

In order to obtain the so called *sloppy* reading, where Draco thinks that Draco deserves an *Outstanding*, the elided predicate is construed as in (22a), employing variable binding. The *strict* reading, in which Draco thinks that Hermione deserves an *Outstanding*, is obtained by means of employing the coreference relation as shown in (22b).

The different interpretations in (22) illustrate that non-reflexive pronouns can express both bound variable relations and coreference with a c-commanding antecedent. As we saw in the previous section, non-reflexive pronouns may also be coreferent with non c-commanding antecedents, as in (23) below.

(23) **Ginny**$_1$'s brother loves **her**$_1$.

[g(1)'s brother [λx [x loves g(1)]]]	ASSIGNMENT FUNCTION
[Ginny's brother [λx [x loves Ginny]]]	*g(1) = Ginny*

While pronouns can expresss bound variable relations with c-commanding antecedents, as well as coreference relations with c-commanding and non-c-commanding antecedents alike, reflexives like *himself*, on the other hand, can only achieve a bound variable interpretation as illustrated below.

(24) Lockhart$_1$ admires himself$_1$ and Harry does too.

a. Lockhart [λ x [x admires x]]
and Harry [λ x [x admires x]]
Sloppy Interpretation: Harry admires himself. ✓

b. *Lockhart [λ x [x admires Lockhart]]
and Harry [λ x [x admires Lockhart]]
Strict Interpretation: Harry admires Lockhart. X

Crucially, the bound variable reading of *himself* in (24) gives rise to the *sloppy* interpretation sketched out in (24a), which corresponds to a state of affairs where Lockhart admires Lockhart and Harry admires Harry. This reading is indeed available. However, the sloppy interpretation is the only available reading of a sentence like (24). In order to obtain the strict reading, where Lockhart admires Lockhart and Harry also admires Lockhart, a coreference relation between *Lockhart* and *himself* needs to be established. Given that the strict reading of (24) is *not* available, we can

conjecture that reflexive pronouns cannot be coreferent with an antecedent: unlike regular pronouns like *she* as in (22), reflexive pronouns like *himself* must be bound.

While the difference between binding and coreference is necessary to account for the different readings of (22), in Classic Binding Theory accounts, however, this distinction is not taken into account either by the locality constraints or by the derivations proper. The *Binding Principles* do not distinguish between bound variable anaphora and coreference: both relations are subject to the same constraints.

2.2 Classic Binding Theory

The syntactic binding constraints of Chomsky (1981) and Chomsky (1986) defined under the *Principles and Parameters* model, restrict coindexation under certain conditions. A secondary crucial primitive of this account is that of *binding category* (also *governing category*), whose definition is given in (25), where a phrase is understood to be a subject if it is in a specifier position, and a subject S is *accessible to* α if S c-commands α. Arguments for introducing the notion of accessible subject in the definition in (25) can be found in *Section 2.2.1*.

(25) *Binding Category*

β is the binding category for α iff β is the minimal category containing α and a subject accessible to α.

(Chomsky, 1981, ex. (100), p. 220)

The *binding category* serves to identify and restrict the domain in which binding relations can hold between two different constituents.

The principles governing the reference of anaphora like *himself*, pronouns like *him*, are listed below, where *free* is interpreted as *not syntactically bound*.

(26) CHOMSKIAN BINDING PRINCIPLES

Principle **A**: An anaphor is bound in its binding category.

Principle **B**: A pronoun is free in its binding category.

Principle **C:** An R(eferential)-expression is free.[9]

(Chomsky, 1981, ex. (101), p. 220)

The assumption of Principle A, then, is that anaphors like *himself* are bound by a DP antecedent within the smallest XP with a subject which includes both the antecedent and the anaphor. In (27a), the binding category of the direct object *himself* is the minimal phrase which contains *himself* and an accessible subject, which, in this case, corresponds to the embedded TP, *Gilderoy Lockhart loves himself*. According to Priciple A, *himself* must be bound by an antecedent within the embedded TP, namely *Gilderoy Lockhart*, and cannot be bound by an antecedent outside this domain, like the main subject *Harry*. In (27b), the binding category for *himself* is the entire TP. Within this TP, while the subject *Harry's Potions professor* does c-command *himself*, the genitive *Harry* does not c-command *himself*. According to Principle A, then, in (27b), *himself* must be syntactically bound by *Harry's Potions professor*[10], and can neither be coreferent with *Harry* or a bound variable of *Harry*.

(27) a. $\underline{\text{Harry}_2}$ said [$_{\text{TP}}$ **Gilderoy Lockhart**$_1$ loves **himself**$_{1/*2}$ / $\underline{\text{him}_{2/*1}}$].

b. $\underline{\text{Harry}_7\text{'s}}$ **Potions professor**$_3$ hates **himself**$_{3/*7}$ / $\underline{\text{him}_{7/*3}}$.

Principle B, the mirror image of *Principle A*, states that pronouns must be free in their binding category. As illustrated above, *him* may not be coindexed with the local subject either in (27a) or (27b), but may be coindexed with the main sentence subject in (27a), since *Harry* is outside the binding domain of *him*; the pronoun can also be coreferent with the genitive in (27b), since, in this case, *Harry* does not c-command the pronoun *him*.

[9] *Principle C* is not relevant for the discussion carried out in the following chapters of this dissertation. It is included here, however, for the sake of exposition, since Principle C violations were crucial in the development of the first competition-based accounts of the Binding Theory.

[10] Severus Snape.

2.2.1 Accessible Subjects

One of Chomsky (1981)'s motivations for introducing the condition that a binding category should have an *accessible subject* comes from cases where VPs and APs can serve as binding domains. To illustrate, consider the examples below.

(28) a. Snape$_1$ made [$_{VP}$ me like him$_1$]. ✓ PRINCIPLE B

b. *Snape$_1$ made [$_{VP}$ me like himself$_1$]. ∗ PRINCIPLE A

c. Snape$_1$ considers [$_{AP}$ me happy with him$_1$]. ✓ PRINCIPLE B

d. *Snape$_1$ considers [$_{AP}$ me happy with himself$_1$]. ∗ PRINCIPLE A

The APs and VPs in (28) are analyzed as small clauses, which, crucially, have subjects; in (28), the small clause subject is *me*. Given that: (i) a binding category is the minimal category which contains a subject accessible to α; (ii) a subject is accessible to α if it c-commands α; and (iii) *me* is a subject which c-commands *him / himself* in (28), then the binding category for *him* and *himself* in (28a) and (28b), respectively, is the small clause VP *me like him(self)*, while the binding category for *him* and *himself* in (28c) and (28d) corresponds to the AP *me happy with him(self)*. According to the binding principles laid out in (26), *Principle A* and *Principle B* must be obeyed within the small clause APs and VPs, hence, *him* cannot be syntactically bound by an antecedent within the VP/AP, while *himself* must be syntactically bound by such an antecedent. As observed above, *Principle B* is obeyed, *him* being free in its binding category, while *Principle A* is violated, given that the only syntactically permissible binder would have been the subject *me*.

The sentences in (29) below represent the mirror image of (28) above. In the case of (29), the subjects of the small clause VPs and APs are *him* and *himself*, respectively.

(29) a. *Snape$_1$ made [$_{VP}$ him$_1$ laugh]. ∗ PRINCIPLE B

b. Snape$_1$ made [$_{VP}$ himself$_1$ laugh]. ✓ PRINCIPLE A

c. *Snape$_1$ considers [$_{AP}$ him$_1$ happy]. $*$ PRINCIPLE B

d. Snape$_1$ considers [$_{AP}$ himself$_1$ happy]. ✓ PRINCIPLE A

Assuming that *c-command* is not a reflexive operation, i.e. that a node cannot c-command itself, then the small clauses in (29) do not include a subject accessible to *him* and *himself*. Therefore, the binding category for the pronouns and reflexives in (29) is the TP, which contains the closest accessible subject, *Snape*. Consequently, a bound pronoun as in (29a) and (29c) is equivalent to a Principle B violation, while reflexives like *himself* in (29b) and (29c) obey *Principle A* if bound by *Snape*, above.

2.2.2 Binding Amendments

While in many ways revolutionary, Chomsky (1981)'s *Binding Theory* faces a number of empirical challenges. One of the most significant concerns the prediction that anaphors and pronouns are in complementary distribution. This prediction is the (initially) intended result of the assumption that *Principle A* and *Principle B* operate within the same domain. If the binding category for *him* and *himself* is the same, namely the smallest TP in (30), then *himself* must be bound by an antecedent within the TP, while *him* must not. This prediction is met below.

(30) a. **Every professsor**$_1$ charms **himself**$_1$.

b. ***Every professor**$_1$ charms **him**$_1$.

However, there are well known cases of non-complementarity between reflexives and bound pronouns which *Classic Binding Theory* does not predict. According to the definition in (25), the binding category for *himself/him* in (31a), for instance, should be the TP *Lockhart believes pictures of himself/him are on sale*: it contains the pronominal, *himself/him*, as well as an accessible subject, *Lockhart*. While the prediction of *Principle A*, that *himself* must be bound in this domain, is met, *Principle B* states that *him* must be free, which does not hold: *him* is syntactically bound by

Lockhart, the subject of the main clause. While all of the counterexamples below pose their own issues, the case of *Path/Location PPs* had one of the biggest impacts with respect to amending the *Binding Principles* and their locality constraints. I explore these cases in the next section.

(31) COMPLEMENTARITY COUNTEREXAMPLES

a. *Picture NPs*

Lockhart believes pictures of **himself** / **him** are on sale.

b. *Path/Location PPs*

John keeps a snake near **him** / **himself.** [11]

c. *Emphatic / Logophoric Contexts*

Hermione boasted [that Slughorn invited Harry and **her / herself** to his exclusive party].

With respect to the pronoun *herself* in (31c), the general assumption is that it is not a reflexive pronoun, but a *logophor*. While some languages have specialized logophoric pronouns, like Ewe (Clements, 1975), there are also languages where logophors are homophonous with reflexives. English, as shown in Charnavel & Zlogar (2015), Charnavel & Sportiche (2016) and Sloggett (2017), is one such language. Since logophors do not seem to obey *Principle A* (*herself* is not bound within the most minimal TP that contains it), they are often referred to in the literature as *exempt anaphors*, following Pollard & Sag (1992), which typically refer to the attitude holder, in this case, *Hermione*.[12]

Charnavel & Sportiche (2016) argue that logophors like *herself* do obey Principle A, offering a slight variation of its locality domain, which includes logophoric operators. In Charnavel & Sportiche (2016)'s system, exempt anaphors like *herself*

[11] Example first encountered in Postal (1971, p.197).

[12] In Charnavel & Sportiche (2016), an exempt anaphor must be anteceded by an attitude holder or by an empathy locus.

in (31c) are syntactically bound by silent logophoric pronouns found in the subject position of LogP projections at the left periphery of phases, projections headed by a logophoric operator. Under the assumption that the exempt anaphor and the closest logophoric pronoun c-commanding it get spelled out within the same phase, then the anaphor enters a binding relation with the logophoric pronoun, which refers to an attitude holder. [13] Although fascinating, logophors and logophoric centers are not directly relevant to the discussion in this dissertation, which revolves around Condition B effects[14]. Hence, the definition of Condition A which I adopt, spelled out in *Section 2.2.2.2* does not directly extend to exempt anaphora.

Crosslinguistically, there are many counterexamples to the assumption that *Principle A* and *Principle B* should hold within the same binding category. One such case comes from 1st and 2nd person pronouns, which may be either free or locally bound in most Germanic and Romance languages, as shown in the examples from Romanian below. According to *Principle B*, pronouns should be free in their binding category, which, in the following example, is the smallest TP; consequently the data below would be classified as *Principle B* violations.

(32) a. Eu$_1$ *mă*$_1$ *admir* *pe* ***mine***$_1$.

I 1ST.SG.CL.ACC admire.1ST.SG ACC me
'I admire myself.'

b. Tu$_1$ *te*$_1$ *admiri* *pe* ***tine***$_1$.

you 2ND.SG.CL.ACC admire.2ND.SG ACC you
'You admire yourself'.

In (32), the direct object pronouns *mine* 'me' and *tine* 'you' are coindexed with the

[13] *Exempt anaphors* are also bound in Sundaresan (2020), who argues that perspectival anaphors are born with an unvalued "[DEP]" feature. In a given phase, only the specifier of a Perspectival Phrase is born with a valued DEP feature, which the perspectival anaphor agrees with, and consequently gets its logophoric interpretation.

[14] Some accounts, like Reinhart & Reuland (1993) treat reflexive pronouns in *picture NPs* like (31a) as exempt anaphors. However, as shown in Büring (2005), the distribution of *-self* pronouns in *picture NPs* can be captured by Condition A. I assume, with Büring (2005), that *-self* pronouns in picture NPs are not logophoric.

local subject, hence according to the definition of syntactic binding, are bound by the local subject. These examples would be unproblematic if *mine* and *tine* would only function as reflexive pronouns. However, like English *him*, 1st and 2nd person pronouns in Romanian (as well as German and Romance in general), need not be bound. In (33), below, the same pronouns are used referentially.

(33) a. Ea$_1$ *mă*$_2$ *admiră* *pe* ***mine***$_2$.
she 1ST.SG.CL.ACC admire.3RD.SG ACC me
'She admires me.'

b. Ea$_1$ *te*$_2$ *admiră* *pe* ***tine***$_2$.
she 2ND.SG.CL.ACC admire.3RD.SG ACC you
'She admires you.'

Furthermore, local binding of 3rd person pronouns is also allowed in a number of languages, including Frisian (Everaert, 1986), Old English (Van Gelderen, 2000), Khanty(Volkova & Reuland, 2014), and Chamorro (Wagers et al., 2018). Romanian is also a language where 3rd person pronouns may be bound locally, as shown by (34a). The sentence in (34b) illustrates that *el* 'him', like its 1st and 2nd person counterparts in (33), is not a reflexive pronoun: it need not be bound.

(34) a. ***Lockhart***$_1$ / ***fiecare professor***$_1$ *se* *admiră* *pe* ***el***$_1$.
Lockhart / every professor REFL.CL.ACC admire.3RD.SG ACC him
'Lockhart / Every professor admires himself.'

b. *Hermione*$_2$ *îl* *admiră* *pe* ***el***$_1$.
Hermione MASC.SG.CL.ACC admire.3RD.SG ACC him
'Hermione admires him.'

As observed above, the distribution and interpretation of Romanian pronouns cannot be captured by the assumptions and of Chomsky (1981)'s *Binding Principles*.

2.2.2.1 Problematic PPs

Let us now consider the problems posed by (31b) in the previous section. One requirement of binding categories is that they should contain a *subject*. In this sense, it is not predicted that prepositional phrases can constitute binding categories, since PPs do not have subjects. Under this assumption, *Principle B* then captures the fact that pronouns must be free in constructions like the ones below, where PPs clearly do not constitute binding categories.

(35) a. *$\textbf{Dobby}_9$ gave a sock [$_{PP}$ to $\textbf{him}_9$].

b. *$\textbf{Hermione}_3$ relies [$_{PP}$ on $\textbf{her}_3$].

At the same time, the grammaticality of the bound pronouns *him* and *her* in (36)[15] is surprising: the current theory fails to predict that pronouns cannot be syntactically bound by a local antecedent in the sentences in (35), but can be syntactically bound in (36) below.

(36) a. $\textbf{Ginny}_8$ pulled the blanket over $\textbf{her}_8$.

b. $\textbf{Flitwick}_6$ placed the wand behind $\textbf{him}_6$.

The issue of bound pronouns within *Path/Location PPs* has been observed in a number of languages (English, Dutch, Spanish, etc.). There are various accounts which attempt to capture these facts (Chomsky (1981, 1986) Hestvik (1991), Büring (2005), Lederer (2009), a.o.), the general proposal being that the binding domains for reflexives and pronouns differ.[16] Hestvik (1991)'s proposal, for instance, relies on

[15] While sentences like these are reported to be grammatical in the literature, there are native speakers of English who prefer the reflexive *himself* or *herself* in these syntactic contexts.

[16] Chomsky (1986) redefines the *binding domain*, as a CFC (*Complete Functional Complex*). A CFC is the domain in which all grammatical functions of a given predicate are realized. The binding domain for α then becomes the smallest CFC which contains α and for which there is an indexing *I* that is *BT compatible*. According to the notion of *BT Compatibility*, the following constraints hold: (i) anaphors must be bound; (ii) pronominals need not be bound; (iii) indexation must obey the *i-within-i* condition (a phrase may not be coindexed with one of its proper subconstituents); (iv) nominal heads may carry indices, but only nominal phrases can serve as antecedents.

two main components: (i) binding domains should be reduced to the minimal θ-domain in which all θ-roles are assigned by the θ-assigners they contain, and (ii) PPs may serve as subjectless binding domains for pronouns, but not for anaphors.

Inspired by Bresnan (1987), Hestvik (1991) suggests that PPs differ in terms of their argument structure. Under this account, prepositions like *on* in the predicate *rely on*, have no argument structure, while *behind* in *place behind* does. Essentially, since *behind* and *over* assign their own θ-role to their prepositional objects, the PPs in (36) serve as binding domains for *him*. *Principle B*, then, is obeyed within the PP: *him* is free in its binding domain.

On the other hand, the prepositional objects of predicates like *rely on* in (37) receive their θ-role from the verb: *on* cannot assign a θ-role of its own, since it does not have an argument structure. Consequently, the binding category for the prepositional object is one which contains the verb, namely the entire sentence.

(37) a. **Dobby**$_9$ gave a sock [$_{PP}$ to **himself**$_9$ / ***him**$_9$].

b. **Hermione**$_3$ relies [$_{PP}$ on **herself**$_3$ / ***her**$_3$].

For sentences like (37), then, the binding domain for pronouns and reflexives is the same, and in order to obey both *Principle A* and *Principle B*, the reflexive *himself* must be bound by the sentence subject, while *him* must not.[17]

Consequently, the binding domain for an anaphor is represented by the smallest CFC in which it can be bound under some indexing *I*, while for pronouns, the binding domain is the smallest CFC in which it can be free under the indexation I. In this sense, the binding domain for pronouns in (36) is taken to be the prepositional phrase, while the binding domain for anaphors is taken to be the entire sentence.

The CFC later served as the inspiration for the *coargument domain* introduced by Büring (2005).

[17]Hestvik (1991) lists the following predicates whose prepositions do not assign their own θ-roles: **by** - *abide by*; **on** - *call on, comment on, depend on, lecture on, live on, reflect on, rely on, insist on, check up on, break in on, look in on, walk out on, look down on, cut down on, congratulate someone on*; **for** - *care for, long for, pay for, pray for, ask for, vote for/against, stand up for*; **at** - *curse at, look at, marvel at, ponder at, scoff at, stare at, gaze at, glance at*; **with** - *cope with, deal with, meddle with, part with, tinker with, agree with, experiment with, put up with, get away with, charge someone with*; **in** - *indulge in, invest in, trust in, believe in*; **of** - *approve of, convince someone of, deprive someone of, inform someone of, remind someone of, rob someone of*; **from** - *deviate from, learn from*; **about** - *learn about, moralize about, boast about, brag about, complain about, write about, read about*; **to** - *listen to, object to, refer to, adhere to, belong to, look forward to, look up to, sentence someone to, treat someoone to, compare someone/something to* (Hestvik, 1991, fn. 6, p. 478).

2.2.2.2 Coargument Domain

Büring (2005) builds on Hestvik (1991) in formulating his conditions on the locality constraints of *Principle A* and *Principle B*. In his view, the binding patterns of PP object pronouns are correlated with a preposition's ability to undergo *semantic composition*.[18] According to Büring (2005), only semantically salient PPs (*beneath*, *around*) which make a clear semantic contribution, can be binding domains, while semantically *empty* prepositions (*on, at, to, about*) do not allow their object personal pronouns to co-refer with an antecedent within the same sentence.

(38) a. **Hermione**$_2$ looked around **her**$_2$ / **herself**$_2$.

b. **Hermione**$_2$ relies on *her$_2$ / **herself**$_2$**.**

c. **Hermione**$_2$ talked about *her$_2$ / **herself**$_2$.

According to Büring (2005), similarly to Hestvik (1991), the crucial difference between the three sentences above lies in the θ-role assigner of *her / herself*. In the case of (38b) and (38c), the preposition is a pure functional element that serves to assign case, the direct object receiving its θ-role from the verb. Verbs like *rely* and *talk* assign a θ-role *(Theme)* to the PP's object, while in (38a), the preposition *around* assigns its object a θ-role *(Location)* directly. Büring (2005) adjusts the definition of a *binding domain* for pronouns so that it can include cases like (38a).

(39) BINDING DOMAIN (FOR PRINCIPLE A)

D is the binding domain for α if D is the smallest phrase that contains α and an accessible subject.

(adapted from Büring, 2005, p. 55)

[18]The semantic contribution of PPs is also relevant for Lederer (2009), who argues that the prepositions which allow coindexation of anaphors and pronouns with local subjects are those that express spatial relations (*next to, behind*) and *containerhood* (*in, within, etc.*). In her dissertation, she provides corpus evidence which supports the predictions of Hestvik (1991) and Büring (2005) regarding the distribution of anaphora and pronouns as PP objects in both English and Spanish.

(40) COARGUMENT DOMAIN (FOR PRINCIPLE B)

An NP's *coargument domain* is the smallest constituent X which contains: (i) NP, (ii) NP's case assigner C[19], (iii) NP's θ-role assigner T, and (iv) every XP whose case or θ-role is assigned by C or T.

(Büring, 2005, ex. (3.29), p. 56)

(41) BÜRING (2005)'S BINDING CONDITIONS

a. **Condition A**

A reflexive must be syntactically bound in its binding domain.

b. **Condition B**

A pronoun must be free in its coargument domain.

(adapted from Büring, 2005, ex. (3.26), p. 55)

Under this view, the binding domain for anaphors is virtually unchanged from Chomsky (1981)'s *binding category*, whereas the binding domain for pronouns is reduced to the *coargument domain* in (40). This essentially says that Condition B is satisfied if the DP which binds a given pronoun is not within the smallest XP containing the pronoun's case and θ-role assigners.

While, perhaps, not the most elegant solution, Büring (2005)'s *Binding Theory* does capture the English data. Since anaphors require that their binding domains have subjects, the binding domain for *herself* in the sentences in (38a) is the entire TP, where the reflexive is indeed bound. In the case of (38a), *around* is both the case and θ-role assigner for *her*, making the PP the coargument domain. The pronoun *her* in (38a) is bound by *Hermione,* outside its coargument domain, thus obeying *Condition B*. As for (38b) and (38c), however, *on* and *about* are not the θ-role assigners for their complement, which prevents the corresponding PPs from serving as

[19]The requirement regarding case assigners in (40), inspired by Chomsky (1986)'s definition of *governing category*, is introduced to capture the distribution of pronouns and reflexives in exceptional case marking environments. Furthermore, an NP's case assigner can also be a verb, in cases where the verb is an accusative (or dative) case assigner.

coargument domains. Consequently, the coargument domain for *her* in (38b) and (38c) is the entire TP; thus, for these sentences, in order to obey *Condition B*, *her* cannot be bound by *Hermione*.

The same kind of reasoning can account for the lack of complementary distribution between pronouns and reflexives in *picture NPs*. The example from (31a) is repeated in (42) below. The reflexive *himself*, according to the definition of Condition A in (41), must be bound within the smallest category containing it and a c-commanding subject. In (42), the only available c-commanding subject is *Lockhart*. Hence, the binding domain of *himself* is the entire TP, and *himself* may (and must) be bound by *Lockhart*.

(42) **Lockhart**$_1$ believes [pictures of **himself**$_1$ / **him**$_1$ are on sale].

With respect to *him*, its coargument domain, as defined in (41), is the smallest phrase which contains *him*, *him*'s case assigner, namely *of*, *him*'s θ-role assigner, namely *pictures*, and every phrase which receives a θ-role or case from *pictures* and *of*. These two constituents assign no other case or roles, which makes the coargument domain of *him* be *pictures of him*. According to Condition B, *him* must be free in this domain, which it is, thus accounting for the grammaticality of (42).

In *Section 2.2.1*, I discussed Chomsky (1981)'s motivation for the introduction of the *accessible subject* requirement by considering examples like those below. This data is also captured by Büring (2005)'s system.

(43) a. **Snape**$_1$ considers [$_{AP}$ me happy with **him**$_1$]. ✓ CONDITION B

b. *Snape$_1$ considers [$_{AP}$ me happy with himself$_1$]. ∗ CONDITION A

c. *Snape$_1$ considers [$_{AP}$ him$_1$ happy]. ∗ CONDITION B

d. **Snape**$_1$ considers [$_{AP}$ **himself**$_1$ happy]. ✓ CONDITION A

According to Büring (2005)'s definition of binding domain, a reflexive must obey *Condition A* in the smallest clause that contains the reflexive and an accessible sub-

ject. In the case of (43b), the accessible subject is *me*, hence the binding domain for *himself* would be the AP phrase. However, *me* does not bind *himself*, since *me* and *himself* do not share an index, thus disobeying *Condition A* and rendering the sentence ungrammatical. In (43d), however, the accessible subject for *himself* is *Snape*; in this case, the binding domain is the TP, which includes the binder of *himself*, therefore, (43d) obeys *Condition A*. With respect to (43a), the coargument domain for *him* is the smallest phrase which contains *him*, the case assigner of *him*, namely *with*, the θ-role assigner of *him*, namely *happy*, and the other phrases which receive case or θ-roles from *him*'s assigner(s), in this case, *me*, which receives a θ-role from *happy*. Thus, the coargument domain for *him* in (43a) is the AP, and in this domain, *him* is not bound, thus obeying *Condition B*. In (43c), however, *him* receives case from *considers*, which means that *Snape* will also be a part of the coargument domain of *him*. Given that *Snape* binds *him* in this domain, *Condition B* is violated, thus rendering (43c) ungrammatical.

Büring (2005)'s implementation, similarly to the revised *Binding Theory* in Chomsky (1986), also successfully captures the distribution of reflexives and pronouns in exceptional case marking (ECM) structures, so dubbed due to the fact that the subject of the infinitival clause receives case from the main clause verb. As illustrated in (44), although the reflexive *himself* and the pronoun *him* are subjects of the infinitival TP, *himself* must be bound by the main sentence subject, *Snape*, while *him* must not.

According to the definition in (40), the coargument domain for *him* in (44c) and (44d) above consists of *him*, the case assigner of *him*, the θ-role assigner of *him*, and every phrase whose case or θ-role is assigned by *him*'s case and θ-role assigner(s).

(44) a. **Snape**$_1$ considers **himself**$_1$ to be happy.

b. *__Snape__$_1$ believes I$_2$ consider **himself**$_1$ to be happy.

c. *__Snape__$_1$ considers **him**$_1$ to be happy.

d. **Snape**$_1$ believes I_2 consider **him**$_1$ to be happy.

In (44c) and (44d), *him* receives its θ-role from the predicate *happy*, and receives its case, Accusative, from the verb *considers*. The verb *considers* assigns a θ-role to the main clause subject *Snape*. Consequently, following the definition in (40), the coargument domain of *him* also includes *Snape*. Thus, according to Condition B in (41), *him* cannot be bound by *Snape* and the ungrammaticality of (44c) is due to a Condition B violation.

In turn, the ungrammaticality of (44b) is due to a Condition A violation. According to the definition of Condition A in (41), the reflexive *himself* must be bound within the smallest category containing it and an accessible subject, which, in (44b) is *I*. The smallest category containing *himself* and *I* is the TP *I consider himself to be happy* and hence, *himself* must be bound within this domain, which it is not.

With respect to *Classic Binding Theory* accounts, Büring (2005)'s system is the most comprehensive, capturing the distribution of pronouns and reflexives in ECM constructions, argument and adjunct PPs, as well as *picture NP*s in English[20]. However, like Chomsky (1981) and Chomsky (1986)'s accounts, it does not always extend to other languages. Given that, in Büring (2005)'s system, the ability of a PP to serve as a coargument domain is dependent on its semantic contribution, a cross-linguistic prediction is that PPs headed by semantically 'inert' prepositions, like *about*, should systematically be unable to serve as coargument domains. This prediction, as exemplified above, is unmet in Romanian, as illustrated below.

(45) a. **Lockhart**$_4$ talked about him$_{*4/5}$ / **himself**$_{4/*5}$ all evening.

b. **Lockhart**$_4$ a vorbit despre **el**$_{4/5}$ / **sine**$_{4/*5}$ toată seara

Lockhart has talked about him / himself all evening

'Lockhart talked about him(self) all evening'.

[20]Büring (2005) does not account for the binding of exempt (or perspectival) anaphors.

In (45) above, *about* and its Romanian counterpart, *despre*, assign case to their prepositional object, but not a θ-role. Given that *el* 'him' would receive a θ-role from the verb, and given that the verb also assigns a θ-role to *Lockhart*, then *Lockhart* is within the coargument domain of *el*. Consequently, the sentence in (45) is a Condition B violation. In fact, (45) is a Condition B violation in all *Classic Binding Theory* accounts, including Chomsky (1981), Chomsky (1986) and Reinhart & Reuland (1993). We return to this point below in *Section 2.4*.

2.3 Competition-Based Accounts

Classic Binding Theory accounts treat *Principle A* and *Principle B* independently. Other approaches have taken a different stance, rooted in the competition between different interpretations and/or different pronominal forms. Competition based accounts of the Binding Theory are typically split along *pragmatic* approaches (Reinhart, 1983b; Levinson, 1987; Grodzinsky & Reinhart, 1993; Schlenker, 2005; Reinhart, 2006; Roelofsen, 2008, 2010, a.o), which assume that competition is at the level of the *interpretation* of different logical structures, as in (46), and *morpho-syntactic* based approaches (Hellan, 1988; Burzio, 1989, 1991, 1996; Reuland, 2001; Safir, 2004; Rooryck & vanden Wyngaerd, 2011; Reuland, 2011, 2017, a.o.) which propose that competition is not at the level of interpretation, but at the level of the pronominal forms available within a language.

A critical assumption is that pronouns like *her* can, in principle, express coreference with terms in their binding category, but that this interpretation is allowed only when their meaning differs from the one that a reflexive would provide. Examples illustrating this distinction are found in (46) below.[21]

[21] In the derivations in (46), I assume the following denotation of *only x*, where x is an entity referenced by a referential DP and ALT(x) returns the set of individuals which are contextually relevant; these alternatives are constrained by the context.

(i) *Rooth (1985)'s constituent* ONLY

(46) CONTEXTUALLY INFORMED COMPETITION

a. **Context:** *We are discussing which of the candidates voted for themselves.*

i. ✓ (Only) Hillary$_1$ voted for herself$_1$.

SIMPLE LF: g(1) [λx [x voted for x]] *g(1) = Hillary*

ONLY LF: ∀y ∈ ALT(g(1)) [y voted for y → y = g(1)] *g(1) = Hillary*

ii. # (Only) Hillary voted for her.

SIMPLE LF: g(1) [λx [x voted for g(1)]] *g(1) = Hillary*

ONLY LF: ∀y ∈ ALT(g(1)) [y voted for g(1) → y = g(1)] *g(1) = Hillary*

b. **Context:** *We are discussing which of the candidates voted for Hillary.*

i. ✓ (Only) Hillary voted for her.

SIMPLE LF: g(1) [λx [x voted for g(1)]] *g(1) = Hillary*

ONLY LF: ∀y ∈ ALT(g(1)) [y voted for g(1) → y = g(1)] *g(1) = Hillary*

ii. # (Only) Hillary voted for herself.

SIMPLE LF: g(1) [λx [x voted for x]] *g(1) = Hillary*

ONLY LF: ∀y ∈ ALT(g(1)) [y voted for y → y = g(1)] *g(1) = Hillary*

In (46a), the context concerns candidates who voted for themselves. According to the semantics provided for (46a-i), the *herself* alternative, the only available reading is that (out of all of the relevant candidates) Hillary is the (only) candidate who voted for themselves. However, the semantics provided in (46a-ii) for the *her* alter-

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[[only x]] = λP$_{<e,t>}$: ∀y ∈ ALT(x) [P(y) = 1 → y = x] (adapted from Rooth, 1985, p.82)

In essence, according to the denotation above, given a predicate P, for all entites y in the set of contextually relevant entities, if the predicate P is true of y, then y is the same entity as x. Under the assumption of the denotation above, *only Hillary* has the following meaning:

(ii) *Rooth (1985)'s constituent* ONLY
[[only Hillary]] = λP$_{<e,t>}$: ∀y ∈ ALT(Hillary) [P(y) = 1 → y = Hillary]
(adapted from Rooth, 1985, p.82)

In the contexts in (46), the set of contextually relevant alternatives to Hillary, ALT(Hillary), corresponds to the set of candidates {Hillary, Bernie, Trump, ...}.

However, the denotation above is a simplification, which, among other things, does not reference how focus alternatives are computed. See von Fintel (1997) for a discussion on the issues which arise by defining the lexical entry of *only*.

native leads to the interpretation that (out of all of the relevant candidates) Hillary is the (only) one who voted for Hillary. Consequently, in the context of (46a), the (46a-i) alternative is felicitous, while (46a-ii) is not. *(Only) Hillary voted for herself* is chosen in this scenario.

With respect to (46b), the context concerns concerns candidates who voted for Hillary in particular. Given the semantic interpretation of the two alternatives, (46b-ii) is not felicitous, since it conveys the reading that (out of all of the relevant candidates) Hillary is the (only) one who voted for herself. Hence, (46b-i), which conveys the interpretation that (out of all of the relevant candidates) Hillary is the (only) candidate who voted for Hillary, is chosen in this scenario.

2.3.1 The Coreference Rule

To account for facts like these, Reinhart (1983a) argues that *Principles B* and *C*, which in *Classic Binding Theory* reflect constraints on coindexation, should be recast as constraints on *interpretation*. Examples (47b) and (47c) provide evidence in favor of distinguishing between *Classic Principle B*, which prevents coindexation between a pronoun and a local antecedent, and a constraint which disallows the bound variable interpretation of pronouns while allowing for coreference between pronouns and local antecedents under certain conditions.

(47) a. I know what John and *Bill* have in common. John thinks that *Bill* is terrific and *Bill* thinks that *Bill* is terrific.

(Evans, 1980, ex (49), p. 356)

b. I know what John and *Mary* have in common. John hates *Mary* and *Mary* hates *her* too.

(Roelofsen, 2010, ex (10), p. 118)

c. Despite the big fuss about *Felix*'s candidacy, when we counted the votes

we found out that in fact only *Felix* himself voted for *him*.[22]

(Reinhart, 1983a, ex. (58), p.169)

Crucially, coreference between the italicized pronouns and referential DPs in the examples above is allowed when the alternatives to these sentences would not have conveyed the intended meaning. In (47a), for instance, replacing *Bill thinks that Bill is terrific* with *Bill thinks that he is terrific* would have resulted in an ambiguous construction: the sentence is felicitous in a context where Bill thinks Bill is terrific, as well as a situation where Bill thinks John is terrific. With respect to (47b), replacing *her* with *herself* would have resulted in the sentence *Mary hates herself too*, which, due to the discourse particle *too*, conveys the reading that someone else hates themselves, an interpretation which is not compatible with the sentence context. Similarly, replacing *him* with *himself* in (47c) would have led to an unintended reflexive interpretation: *Felix is the only candidate who voted for themselves*, as in the example discussed in (46).

Based on these empirical observations, Reinhart (1983a) argues that while binding is syntactically constrained, pragmatic reasoning is also involved in establishing (co)reference relations, and, furthermore, that the pragmatic analysis of coreference is closer to generating empirically correct data than syntactic analyses (Reinhart, 1983a, p. 170). Inspired by Dowty (1980), Reinhart (1983a, 2006) assumes that speakers attempt to *minimize interpretative options*, which leads to unambiguous bound variable anaphora being preferred over pronouns which express corefer-

[22]This particular contrast was first observed by Geach (1962). While the *himself* sentence in (ia) is interpreted as Satan being the only one who feels self-pity (no one else pities themselves), the alternative in (ib) is only compatible with a reading where Satan is the only one who pities Satan and no one else pities Satan.

(i) a. Only Satan pities himself. ⇝ *No one else pities themselves.*
b. Only Satan pities Satan. ⇝ *No one else pities Satan.*

(Geach, 1962, p.159)

ence. Although inspired by pragmatic reasoning[23], Reinhart (1983a)'s account is not Gricean. Reinhart (1983a) and Grodzinsky & Reinhart (1993) encode the assumed preference of bound variable LFs over LFs which express coreference[24] in an economy constraint, namely *Rule I*[25], whose definition is given in (48) below.[26]

(48) RULE I: INTRASENTENTIAL COREFERENCE

NP A cannot corefer with NP B if replacing A with C, C a variable bound by B, yields an *indistinguishable interpretation*.

(adapted from Grodzinsky & Reinhart, 1993, p. 79)

The intuition is that native speakers construct and compute different alternative

[23]Reinhart (1983a)'s formulation of *Speaker* and *Hearer* strategies is as follows.

(i) a. *Speaker's Strategy*
When a syntactic structure you are using allows bound-anaphora interpretation, then use it if you intend your expressions to corefer, unless you have some reasons to avoid bound anaphora.

b. *Hearer's Strategy*
If the speaker avoids the bound-anaphora options provided by the structure he is using, then, unless he has reasons to avoid bound anaphora, he did not indend his expressions to corefer. Reinhart (1983a, ex (52), p.167)

[24]The assumption that bound variable relations are preferred to coreference relations has been motivated in different ways. For instance, Reuland (2001) and Reuland (2011) argue that coreference relations are more costly because they are computed after spell-out. Discourse computations, like coreference, are assumed to carry a heavier processing load than relations established at the level of syntax-semantics, like variable binding. Hence, coreference relations are dispreferred to bound variable anaphora.

[25]Later, Reinhart (2006) reformulates *Rule I* as follows, where the definition of *A-binding* in (ii) is equivalent to *semantic binding* as described in *Section 2.1.1*.

(i) RULE I (AN INTERFACE RULE)
α and β cannot be covalued in a derivation D, if

a. α is in a configuration to A-bind β, and

b. α cannot A-bind β in D, and

c. The covaluation interpretation is indistinguishable from what would be obtained if α A-binds β. (Reinhart, 2006, ex. (36), p. 185)

(ii) *A-Binding*
α *a-binds* β iff α is the sister of a λ-predicate whose operator binds β.
(Reinhart, 2006, ex. (11), p.171)

[26]However, see Frazier & Clifton (2000) for psycholinguistic evidence against a principle which ranks bound variable relations above coreference relations. A discussion of their experimental results is found in *Chapter 4*.

logical forms when interpreting an utterance. In order to decide whether *Rule I* allows *him* in (47c) to corefer with *Felix*, speakers will first determine whether the unbound pronoun can be replaced with a bound variable. Speakers would then compare the possible representations, relative to the context, and decide whether the interpretations are different. If by replacing the pronoun *him* with a bound variable, the same meaning is obtained, then coreference is blocked. According to *Rule I*, then, coreference between two DPs is prohibited if the same assertion about the entities in question could be achieved by means of a bound variable relation. Following this reasoning, Reinhart (1983a) points out that speakers, as we saw above, will determine that (49a) has a distinguishable reading from (49b), which means that the coreference reading is allowed.

(49) a. Only **Felix**$_1$ λ_1 t_1 voted for **himself**$_1$.

$\rightsquigarrow$ *No one else voted for themselves.*

b. Only **Felix**$_1$ λ_2 t_2 voted for **him**$_1$.

$\rightsquigarrow$ *No one else voted for Felix.*

There is no doubt that Reinhart's body of work on anaphora and reference has been instrumental in the understanding of these phenomena and subsequent seminal work thereof. Among other extensions, Reinhart (1983a)'s *Rule I* has been adapted into Fox (1998)'s *Rule H*, based on a 1993 draft of Heim (1998)[27], and later Büring (2005)'s *Have Local Binding!*[28], and Roelofsen (2010)'s *Coreference Rule*. All of the

[27] In Heim (1998), two NPs are codetermined if they are in a binding relation, or if they corefer, or if they are cobound with a third NP.

(i) *Heim (1998)'s Exceptional Codetermination Rule*
Let LF be a logical form in which a pronoun is codetermined with, but not bound by one if its coarguments. Then, LF is (marginally) allowed, in violation of Condition B, if it is semantically distinguishable from its binding alternative in the given context.
(Roelofsen, 2008, Def. 2.10, p.54)

[28] Büring (2005)'s constraint on exceptional coreference is formulated as follows.

(i) *Have Local Binding!*
For any two NPs α and β in S in context C, if α could bind β (i.e. if it c-commands β and

aforementioned definitions aim to capture grammatical coreference constructions by means of their competition with bound variable configurations with distinguishable interpretations. One major contribution of Roelofsen (2008) and Roelofsen (2010) is that of formalizing the notion of *binding alternatives* (originally proposed in Heim (1998)), which correspond to Reinhart (2006)'s *reference set* LFs, thus restricting the alternatives with which a given coreferent LF is compared. Unlike *Rule I*, which compares logical relations (i.e. binding vs. coreference), Roelofsen (2010)'s implementation compares linguistic objects (i.e LFs) in a certain context, which is closer to Dowty (1980)'s initial proposal that disjoint reference effects for pronouns are due to pragmatic inferencing.

(50) BINDING ALTERNATIVES

Let C be a context, let LF be a logical form, and let A and B be two DPs in LF such that A and B corefer in C and A c-commands B in LF. Then, the structure obtained from LF by replacing B with a (possibly reflexive) pronoun bound by A is called a *binding alternative* of LF in C.

(adapted from Roelofsen, 2010, def. 3, p.120)

The definition above states that, given a configuration which expresses coreference between two elements A and B, if A c-commands B, then *binding alternatives* are created by generating LFs in which B is replaced by a λ-bound variable. Crucially, the definition in (50) does not prevent regular pronouns from being bound. The λ-binding alternatives of a term like in (51), where *him* and *Lockhart* are coindexed, are given in (51a), where the reflexive *himself* is bound by *Lockhart*, and (51b), where the pronoun *him* is bound by *Lockhart*,

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β is not bound in α's c-command domain already), α must bind β, unless that results in a distinguishable interpretation in C.

(Büring, 2005, ex. (7.31), p.154)

(51) *Binding Alernatives for:*

Lockhart$_1$ λ_2 t_2 admires **him**$_1$.

a. **Lockhart**$_1$ λ_1 t_1 admires **himself**$_1$.

b. **Lockhart**$_1$ λ_1 t_1 admires **him**$_1$.

The selection of an LF out of the alternatives above relies on the application of syntactic constraints. Like Reinhart (1983a), Roelofsen (2010) assumes that *Condition B* does not prevent pronouns like *him* from being coreferent with a local antecedent, but it does prevent the binding of these pronouns. However, if *Condition B* is formulated as a constraint on indexation, as in *Classic Binding Theory*, given the indexation system we have adopted[29], both (51) and (51b) would be rendered ungrammatical. To address this issue, I offer the following revised definition of Büring (2005)'s Condition B, stated in terms of semantic binding.

(52) **Semantic Condition B**

A pronoun cannot be semantically bound within its coargument domain.

(adapted from Büring, 2005, ex. (3.26), p. 55)

Crucially, the constraint in (52) will only rule out LFs where pronouns are *semantically bound*, such as (53c). The LF in (53a), where *Lockhart* and *him* are coindexed, does not involve λ-binding, and hence, does not fall under the purview of *Semantic Condition B*. Thus, the only two grammatical alternatives are (53a) and (53b).

(53) a. **Lockhart**$_1$ λ_2 t_2 admires **him**$_1$.

b. **Lockhart**$_1$ λ_1 t_1 admires **himself**$_1$.

c. * **Lockhart**$_1$ λ_1 t_1 admires **him**$_1$. CONDITION B VIOLATION

Now we can state Roelofsen (2010)'s condition that derives *Rule I*'s effects.

[29] In Roelofsen (2010), this issue is addressed via an indexing system whereby coreference relations do not involve the use of indices.

(54) COREFERENCE RULE

A speaker will never use a logical form LF in a context C if the LF is semantically indistinguishable[30] from one of its binding alternatives.

(Roelofsen, 2010, p. 119)

At this point, Roelofsen (2010)'s *Coreference Rule*, given in (54), can apply. This rule states that if the meaning of a sentence is not affected by replacing a free DP (i.e. an unbound pronoun) with a bound variable, then the alternative with the unbound pronoun will not be chosen. Similarly to *Rule I*, the constraint above ensures that whenever the same meaning can be achieved by means of a bound variable, the bound variable will be the only choice.[31] For instance, in the context in (55), the reflexive *himself* and the coreferent pronoun *him* would express the same meaning, that *Lockhart* is his own admirer. Since *himself* and *him* do not have distinguishable interpretations, the reflexive will be chosen, given that only *himself* can grammatically convey a bound variable interpretation, which, according to the *Coreference Rule*, is preferred to coreference. In (56), however, the question under discussion

[30]The application of *Rule I* and its theoretical successors, like the *Coreference Rule*, depends on the notion of *semantically indistinguishable alternatives*, which, intuitively, corresponds to minimally different constructions which achieve the same meaning. In his dissertation, Roelofsen (2008) formalizes this intuition and adopts the following working definition of *semantic indistinguishability*.

(i) *Roelofsen (2008)'s Semantic Indistinguishability*
Two logical forms LF and LF' are semantically indistinguishable iff:
a. LF and LF' express the same proposition, and
b. LF and LF' have the same focus value

(Roelofsen, 2008, Def. 2.11, p.55)

[31]Roelofsen (2008) and Roelofsen (2010) translate Reinhart (2006)'s proposal that speakers may not 'sneak in' readings which have already been excluded at the level of syntax into *Rule S*.

(i) *Rule S*
Any interpretation of a given clause X that could be obtained via a logical form of X that violates Condition B (or other syntactic constraints on binding) is illicit.

(Roelofsen, 2010, Def. 17, p.18)

Roelofsen (2008) argues that *Rule S* is not necessarily an instance of hearers *minimizing interpretative options*, as in Reinhart (2006), but, in fact, it is based on the hypothesis that the rejection of a certain interpretation at one level of language cannot be overruled by another level/component. Roelofsen (2008) remains agnostic as to why Rule S exists, and argues that if Rule S is correct, then it provides evidence for both Reinhart (2006) and Reuland (2001)'s hypotheses.

regards people who admire *Lockhart*; in this case, the two alternatives convey different meanings. Given that these two LFs have distinguishable interpretations, and given that the *himself* alternative is not felicitous in this scenario, the alternative with the pronoun will be chosen to express that *Lockhart* is one of the people who admire *Lockhart*.

(55) INDISTINGUISHABLE CONTEXT

When talking about professors who admire themselves...

a. **Lockhart**$_1$ λ_1 t_1 admires **himself**$_1$.

Lockhart [λx [x admires x]]

b. #**Lockhart**$_1$ λ_2 t_2 admires **him**$_1$.

Lockhart [λx [x admires Lockhart]]

(56) DISTINGUISHABLE CONTEXT

When talking about professors who admire Lockhart...

a. #**Lockhart**$_1$ λ_1 t_1 admires **himself**.

Lockhart [λx [x admires x]]

b. **Lockhart**$_1$ λ_2 t_2 admires **him**$_1$.

Lockhart [λx [x admires Lockhart]]

In this sense, the restriction on coreference applies *at the discourse level*, with Roelofsen (2010) further developing Reinhart (1983a)'s proposal that Condition B violations are motivated by a context-dependent pragmatic process.

2.3.2 Deriving Semantic Condition B Effects

The *Semantic Condition B* proposed in (52) complements theories that assume the existence of a constraint like the *Coreference Rule* (Reinhart, 1983a; Grodzinsky & Reinhart, 1993; Reinhart, 2006; Roelofsen, 2010), which favors bound variable LFs, but does not constrain the binding of regular pronouns. However, what *Semantic*

Condition B fails to capture is precisely the underlying assumption of *Classic Binding Theory*, namely that *Principle B* effects appear to arise for pronouns in contexts where *Principle A* could be satisfied. Consider the examples from English below.

(57) a. **Snape**$_1$ λ_1 t_1 considers **himself**$_1$ honest.

b. * Snape$_1$ λ_1 t_1 considers him$_1$ honest.

c. *Snape$_1$ λ_1 t_1 considers that himself/hisself$_1$ is honest.

d. **Snape**$_1$ λ_1 t_1 considers that **he**$_1$ is honest.

As shown in (57) above, the pronoun *him* cannot be bound in (57b), for which a bound reflexive alternative, namely (57a) is available. This state of affairs is outside the purview of the *Coreference Rule*, given that both *him* and *himself* are bound variables: (57b) is a *Semantic Condition B* violation. The crucial difference is revealed by comparing the sentences in (57c) and (57d), only the latter of which is grammatical. In the case of (57c), the ungrammaticality is due to the fact that reflexive pronouns cannot surface as sentence subjects in English[32]. The data set in (57) can be seen as evidence that regular pronouns can be bound as long as a *Principle A* obeying reflexive is not available. This observation can be seen more clearly when looking at other languages.

In *Section 2.2.2*, I presented data from Romanian which illustrated that, like German and other Romance languages, 1st and 2nd person object pronouns can be syntactically bound. To ensure that these pronouns can be semantically bound, I refer to the examples below.[33].

(58) **Context:** *Ava, Beth and Claire went voting yesterday. Ava voted for Beth, Beth for Claire, and Claire for herself. Later, Dorothy asks Claire whether she voted, and*

[32]The same is true for *myself*, *yourself*, etc.; **I consider that myself am honest, *You consider that yourself are honest.*

[33]The German judgments belong to Alex Göbel (p.c.), and the data was collected by Kyle Johnson for Dillon & Johnson (2019)'s Fall 2019 seminar. The pronoun *sie* is possible in the subject position in (59b), but Alex finds an alternative with *die* in subject position more natural, due to focus-marking.

Claire replies: I did, but...

a. *Nur ich habe für mich gestimmt.* GERMAN

only I have for me voted.
'*Only I voted for me.'

⇝ *No one else voted for themselves.*

(Dillon & Johnson, 2019, ex. (42), p. 7, 09/17/19)

b. *Doar eu am votat pentru mine.* ROMANIAN

only I have voted for me
'*Only I voted for me.'

⇝ *No one else voted for themselves.*

In the scenario in (58), *Claire* is the only person who voted for themselves, but not the only person who voted for *Claire*, since *Beth* also voted for *Claire*. In this sense, in (58), a coreferential reading between *Claire* and *me* is ruled out by the context, as is an indexical reading of *me*, and only the bound variable reading is felicitous. Notice that both German and Romanian allow for bound 1st person pronouns in this context.

The scenario in (59) changes minimally. The voting relations remain the same, but this time Alex, who is not among the set of voters, describes the situation.

(59) **Context:** *Ava, Beth and Claire went voting yesterday. Ava voted for Beth, Beth for Claire, and Claire for herself. Later, Dorothy asks Alex whether Claire voted, and Alex replies: yes, but...*

a. **Nur sie$_1$ λ_1 t_1 hat für sie$_1$ gestimmt.* GERMAN

only she has voted for her
'Only she voted for her.'

⇝ *No one else voted for themselves.*

b. *Nur sie*$_1$ λ_1 t_1 *hat für sich*$_1$ *gestimmt*. GERMAN

only she has voted for self
'Only she voted for herself.'

(Dillon & Johnson, 2019, ex. (43-44), p. 7, 09/17/19)

c. #*Doar ea*$_1$ *a votat pentru ea*$_1$. ROMANIAN

only she have voted for her
'*Only she voted for her.'

d. *Doar ea*$_1$ *a votat pentru sine*$_1$ / *ea însăşi*$_1$. ROMANIAN

only she have voted for self / her herself
'Only she voted for herself.'

The context in (59) does not permit coreference between the subject and the object pronoun, given that, once again, there is another person who voted for Claire: Alex may only felicitously convey a bound variable reading. In German, (59a) is reported to be ungrammatical, but the alternative with *sich* in (59b) is felicitous in this context. Unlike in German, the Romanian alternative with the pronoun in (59c) is grammatical, albeit infelicitous in (59). Similarly to German, the Romanian alternatives with reflexive pronouns in (59d) are felicitous in this context.

This pattern is meant to illustrate that when a competing reflexive form is available, such as *sich*, then *Semantic Principle B* effects arise for non-reflexive pronouns like *sie*. However, when such a specialized reflexive form does not exist, as in the case of 1st and 2nd person pronouns, *Semantic Principle B* effects do not arise, and pronouns allow for bound variable readings.

The observation that Principle B effects seem to be dependent on the availability of a Principle A obeying anaphor in the same syntactic position is by no means new. Similarly to Levinson (1987), Burzio argues that *Condition B* effects can be derived by assuming that (i) pronouns and reflexives compete, and (ii) that reflexives are subject to *Condition A*; in turn, by virtue of the competition between

R-expressions and pronominal forms, *Condition C* effects can be derived under the assumption that, when available, pronouns are obligatory.

Burzio (1989) was among the first to propose that, with respect to their competition with anaphoric expressions, pronouns are *elsewhere* forms: pronouns are dispreferred in syntactic positions where anaphors are available. Under the assumption that bound variables have no inherent features and Burzio (1991)'s hierarchy of specification in (60), pronouns cannot be bound as long as a more underspecified form (a reflexive) is available in the same syntactic context. [34]

(60) *Hierarchy of choice for bound DPs*

anaphor >> pronoun >> R-expression

(Burzio, 1991, ex. (22), p.93)

Burzio's proposals regarding the lack of feature makeup of anaphors and bound variables, the hierarchy of specification of referential expressions, and the corollary that pronouns are 'elsewhere' forms become primitives and crucial ingredients for *Binding Theory* accounts which rely on competition at the level of morphological form, such as Safir (2004) and Rooryck & vanden Wyngaerd (2011). Following Pica (1984) and Burzio (1989, 1991, 1996), Rooryck & vanden Wyngaerd (2011) make the following generalization about cross-linguistic Principle B effects.

(61) *Absence of Principle B Effects (APBE)*

Pronouns can behave like anaphors when a dedicated class of reflexive pronouns is lacking.

(adapted from Rooryck & vanden Wyngaerd, 2011, ex. (25), p.19)

Empirical support for *APBE* comes from a number of languages, including Frisian, Swedish, Latin, Russian, and Danish. Recent cross-linguistic evidence in favor of

[34] Burzio (1989) argues that the disjoint reference effect for pronouns is dependent on the availability of anaphors, and, in turn, the disjoint reference effect for R-expressions is dependent on the availability less specified forms: pronouns and anaphors.

this observation also comes from work on less studied languages like Khanty (Volkova & Reuland, 2014), Jambi (Cole et al., 2017), as well as psycholinguistic studies on Chamorro (Wagers et al., 2018). In Danish, for instance, there is a dedicated reflexive possessive form in the singular, namely *sin*, but not in the plural, as observed by Pica (1984) and later Burzio (1989). Consequently, the pronominal possessive can express a reflexive reading only in its plural form, *deres*, as illustrated in (62). The reasoning is that the ungrammaticality of a bound reading for *hans* in (62a) is due to the availability of the form *sin* in (62). In (62c), however, the 3rd person possessive can achieve a bound variable reading, given that the form in (62b) is not attested in Danish.

(62) a. ***Jørgen***$_1$ *elsker* ***sin***$_{1/*2}$ *kone*.
Jørgen loves self.POSS wife
'Jørgen loves his own wife.'

b. *Jørgen*$_1$ *elsker hans*$_{2/*1}$ *kone*.
Jørgen loves his wife
'Jørgen loves some other man's wife.'

c. **De*$_1$ *elsker sine*$_1$ *koner*.
they love self.POSS wives

d. ***De***$_1$ *elsker* ***deres***$_{1/2}$ *koner*.
they love their wives
'They love their wives.'

(Rooryck & vanden Wyngaerd, 2011, ex. (30-31), p.21)

Like Burzio (1989) and Safir (2004), Rooryck & vanden Wyngaerd (2011) prevent the use of a regular pronoun, like *him*, from expressing a bound variable reading as long as there exists a more specialized morphological alternative. In effect, this system predicts *Semantic Condition B* effects in syntactic positions where a reflexive

pronoun could have been used. However, this prediction does not appear to be consistently met. Let us revisit the examples discussed in *Section 2.2.2*.

(63) COMPLEMENTARITY COUNTEREXAMPLES

a. *Picture NPs*

Lockhart believes pictures of **himself / him** are on sale.

b. *Path/Location PPs*

John keeps a snake near **him / himself.**

c. *Emphatic / Logophoric Contexts*

Hermione boasted [that Slughorn invited Harry and **her / herself** to his exclusive party].

The sentences in (63) were problematic for the assumption that *Principle A* and *Principle B* should hold within the same binding domain, given that this assumption leads to the prediction that pronouns and reflexives are in complementary distribution. To address such cases, the solution adopted in *Classic Binding Theory* was to redefine and separate the binding domains for pronouns and anaphors. However, economy derived morphosyntactic competiton based accounts of the *Binding Theory* assume that *Principle B effects* are found in the same binding domain in which *Principle A* operates. Thus, the approach taken by *Classic Binding Theory* for examples like (63) does not extend to competition-based accounts.

A different approach to the cases in (63) would be that the *-self* pronouns in these sentences are all logophoric. Reinhart & Reuland (1993), and later Charnavel & Zlogar (2015), also suggest that *-self* pronouns in *picture NPs* can be logophoric. Evidence in favor of this assumption with respect to picture noun phrases comes from examples like (64), which show that *himself* and *herself* in picture noun phrases need not be c-commanded by their antecedent.

(64) a. The picture of **himself** that **John** saw in the post office was ugly.

b. Her pleasant smile gives most pictures of **herself** an air of confidence.

(Reinhart & Reuland, 1993, ex. (46), p. 682)

Compare the sentences in (64) with those below, where the *itself* is ungrammatical. Given that logophors may only refer to attitude holders and empathy loci (Charnavel & Sportiche, 2016), which are animate discourse referents, if *himself* and *herself* in (64) are logophoric, then the grammaticality contrast between (64) and (65) can be accounted for.

(65) a. *The picture of **itself** that **book** was next to was ugly.

b. *Its beautiful windows gives most pictures of **itself** an air of elegance.

Furthermore, Charnavel & Zlogar (2015) discuss data which indicates that the *-self* pronouns in Path/Location PPs might also be logophoric, given the difference in grammaticality between the set of examples in (66a) and those in (66b) below.

(66) a. *Animate Referent*

i. **The woman** is standing in the background with the cello behind **herself**.

ii. **The woman** is standing in the background with the cello behind **her**.

b. *Inanimate Referent*

i. ***The house** is standing in the background with an elm tree behind **itself.**

ii. **The house** is standing in the background with an elm tree behind **it**.

(adapted from Charnavel & Zlogar, 2015)[35]

[35]These exact examples are not present in the Charnavel & Zlogar (2015) article, but may be found in the CLS 51 presentation slides they used, available at `http://people.fas.harvard.edu/~czlogar/zlogar-cls51.pdf`.

The underlying pattern in the data presented above is that non-logophoric reflexives, like *itself*, are not grammatical as objects of *picture NPs* and *Path/Location PPs*. Furthermore, it appears that pronouns and non-logophoric reflexives are indeed in complementary distribution in these environments; pronouns are not in complementary distribution with logophoric reflexives. This suggests that *Semantic Condition B* effects, as well as Roelofsen (2010)'s *Coreference Rule*, should be the result of the constraint in (67), which assumes that (non-logophoric) reflexive pronouns are subject to *Condition A*, and that only the competition of non-reflexive pronouns with *non-logophoric reflexive* forms may give rise to disjoint reference effects for the former.

(67) **TERMS OF COMPETITION (TOC)**

When choosing between two pronominal forms, P and P', choose P' iff:

i. P and P' have *indistinguishable interpretations* in a context C, and

ii. P' is a (non-logophoric) reflexive pronoun, whereas P is a pronoun

Under the assumption that the *-self* pronouns in (63) are all logophoric, *ToC* would not block the regular non-reflexive pronouns *him* and *her* in the same syntactic position as the logophor from being semantically bound or coreferent with a local antecedent. To test *ToC*'s predictions, consider the examples below.

(68) a. **The Mars Rover / No Mars Rover** took a picture of **itself**. *Picture NP*

b. **The shawl / No shawl** was folded over **itself**. *Path/Location PP*

c. **Every company** posted a letter to **itself**. *Object Position*

d. **The company / No company** expects **itself** to grow within a year. *ECM*

All of the sentences above are grammatical, and given that the referents are inanimate, the *itself* pronouns in (68) cannot be logophoric.[36] Then, *ToC* predicts that

[36]The noun *company* is grammatically neuter, and, in the contexts in (68), it references a business organization, as opposed to a group of individuals. In the case of the latter meaning, plural animate pronouns may be used: *Every company posted a letter to themselves*.

the pronoun *it* may not be used in the same syntactic position to express the same meaning as *itself* in the sentences in (68). We can observe this prediction is borne out by comparing the sentences in (68) with those in (69). Crucially, the sentences below are ungrammatical under a bound variable reading or a locally coreferent interpretation of *it*.

(69) a. *__The Mars Rover__ /*__No Mars Rover__ took a picture of __it__. *Picture NP*

b. *__The shawl__ / *__No shawl__ was folded over __it__. *Path/Location PP*

c. *__Every company__ posted a letter to __it__. *Object Position*

d. *__The company__ / *__No company__ expects __it__ to grow within a year. *ECM*

As illustrated above, *ToC* can accurately predict *Semantic Condition B* effects for pronouns in picture NPs, Path/Location PPs, coargument domains as well as ECM constructions. Furthermore, the ungrammaticality of the *picture NP* and *Path/Location PP* examples in (69a) and (69b) is unexpected under Büring (2005)'s account. As discussed in *Section 2.2.2.2*, Büring (2005)'s definition of the *coargument domain*, which is the domain in which *Condition B* holds of pronuns, includes *picture NPs* and *Path/Location PPs*; therefore, according to Büring (2005)'s system, (69a) and (69b) should be grammatical. Consequently, Büring (2005)'s ingredients are not sufficient to capture the data set in (68) and (69), data which demonstrates that Condition B effects arise for pronouns in syntactic positions where a (non-logophoric) reflexive could have been used to render the same interpretation.

One question that arises, at this point, is what exactly motivates a constraint like *ToC*? To answer this question, let us review the assumptions of pragmatic competition based accounts of reference.

2.3.3 BE CLEAR!

The stance on the pragmatic nature of pronominal reference is generally attributed to Reinhart (1983a), however, it was by no means a novel proposal. Pragmatic approaches to (non)-coreference based on the *avoid ambiguity* principle have also been argued for by Dowty (1980) and Engdahl (1980). The core assumption is that while reflexive pronominal forms must be interpreted as anaphoric, non-reflexive pronouns are referentially ambiguous. If a speaker chooses a more ambiguous mechanism when an unambiguous one could have been chosen, the implicature is that they do not intend coreference. Dowty (1980), in a reply to Bach & Partee (1980), formulates this Gricean implicature as follows.

(70) *Dowty (1980)'s Neo-Gricean Conversational Implicature*

If a language has two (equally simple) types of syntactic structures A and B, such that A is ambiguous between meanings X and Y while B has only meaning X, speakers of the language should reserve structure A for communicating meaning Y (since B would have been available for communicating X unambiguously and would have been chosen if X is what was intended).

(Dowty, 1980, ex. (2), p.32)

Going back to the sentence in (47c), repeated in (71) below, let the two equally simple syntactic structures be A: *Felix voted for him* and B: *Felix voted for himself*. In this case, the alternative with the pronoun is ambiguous between a coreference interpretation, where Felix voted for Felix, and a disjoint reference interpretation, that Felix voted for some other male referent in the discourse. On the other hand, the sentence with the reflexive only allows for the locally coreferent reading. According to (70), then, speakers reserve pronouns for communicating disjoint reference

in these environments.[37]

(71) Despite the big fuss about *Felix*'s candidacy, when we counted the votes we found out that in fact only ***Felix*** himself voted for ***him***.

In pragmatic competition-based accounts like Levinson (1987), Condition B effects are implicatures which result from the assumption that reflexive and non-reflexive pronouns are on a Horn scale, where reflexive pronouns are taken to be more informative than regular pronouns. In this sense, the use of a regular pronoun implies that the reflexive reading was not intended. One issue with this kind of reasoning, as pointed out by Jacobson (2007), is that Principle B effects are not cancellable, like implicatures are. The examples below are adapted from Roelofsen (2010). In (72), the generated implicature, that not all of the students passed the test, is cancellable, and hence, the discourse in (72) is felicitous: *some students passed the test; in fact it is possible that all students passed.* On the other hand, the reflexive interpretation of *Bill voted for him* is not a felicitous continuation of *John thinks that Bill voted for him*, which, according to Levinson (1987), would generate a disjoint reference implicature.

(72) *Cancellable implicature for quantifiers*

Some students passed the test.

Implicature: Not all students passed the test.

[37] Levinson (1987) also argues that the general patterns of pronominal interpretation are instantiations of Gricean maxims, specifically the interaction between the *Maxim of Quantity* and the *Maxim of Manner*. The assumption is that only *Principle A* applies in syntax, while *Principle B* and *Principle C* effects are obtained via pragmatic reasoning. Observing the *Maxim of Quantity* (make your contribution to a conversation as informative and only as informative as is required), a speaker would not use a regular pronoun to express coreference in a syntactic context where an anaphor is available, given that the use of the anaphor would have been more informative. Levinson (1987) defines *informativeness* as follows:

(i) *Informativeness*
A proposition A is MORE INFORMATIVE than a proposition B iff the set of entailments of B is properly contained in the set of entailments of A.

(Levinson, 1987, ex. (38), p.404)

Continuation: In fact, it is possible that all of them passed.

(Roelofsen, 2010, ex. (42))

(73) *Non Cancellable implicature for Principle B*

John thinks that Bill voted for him.

Implicature: John does not think that Bill voted for himself.

Continuation: In fact, it is possible that John thinks that Bill voted for himself.

(Roelofsen, 2010, ex. (43))

Roelofsen (2010) suggests that, while a purely pragmatic account of disjoint reference effects might not capture the English data, it is possible that pragmatic inference patterns have played an important role in the diachronic realization of Condition B effects in English, as described in Levinson (2000). In this sense, perhaps the grammaticalized Condition B effects in English, for instance, are due to pragmatic inference patterns having been *conventionalized*.

Van Gelderen (2000), Levinson (2000) and König & Siemund (2000) argue that Condition B effects did not arise for 3rd person pronouns in English, despite the existence of complex emphatic reflexives *hine selfne* 'him self' in Old English, until Modern English, when the complex emphatic reflexive became the simplex *himself*. Based on this diachronic evidence, which I come back to in *Section 3.5*, I agree with Roelofsen (2010) that, in (modern) English, pragmatic inference patterns with respect to pronominal interpretation have been conventionalized, and argue that the inference patterns grammaticalized as the *ToC* constraint, are due to a conventionalized pragmatic constraint which can be defined as in (74). BE CLEAR!, inspired by Dowty (1980)'s proposal, is a pragmatic constraint which leads to the (sometimes grammaticalized) preference of less ambiguous alternative sentences in a context where these alternatives achieve the same meaning.

(74) **BE CLEAR!**

Given a context C, when choosing between two alternative sentences, S and S', both of which include a non-logophoric pronominal form in the same syntactic position, speak S' iff:

i. S and S' have *indistinguishable interpretations* in C, and

ii. the set of possible interpretations for S' is a **proper subset** of the set of possible interpretations for S.

With respect to the data set in (68) and (69), repeated in (75) for convenience, the application of BE CLEAR! involves a similar reasoning to that of *ToC*, which goes as follows.

(75) a. **The Mars Rover / No Mars Rover** took a picture of **itself** / ***it**.

b. **The shawl / No shawl** was folded over **itself** / ***it**.

c. **Every company** posted a letter to **itself** / ***it**.

d. **The company / No company** expects **itself** / ***it** to grow within a year.

Like *ToC*, the application of BE CLEAR! does not assume the existence of a *Condition B* constraint. This leads to the *it* pronouns in (75) being ambiguous between a bound variable and a disjoint reference reading (where, in the latter, *it* refers to some other non-sentient entity in the discourse). Reflexive pronouns like *itself*, however, are assumed to obey *Condition A* and, in the examples in (75), are bound within the finite TP: their binding domain. Given that the only interpretation available for *itself* in (75) is that of a bound variable, then, these sentences are less ambiguous alternatives of the *it* sentences, should the speaker intend to express a bound variable reading or an indistinguishable coreferent reading. Therefore, the *it* alternatives are not chosen, unless the context allows for distinguishable interpretations of coreference and bound variable LFs, or unless disjoint reference is intended.

Similarly to *Rule I* and the *Coreference Rule*, BE CLEAR! will allow for locally coreferent pronouns in contexts where the use of a reflexive in the same position would have led to a different interpretation. Let us return to the case of contextually constrained competition in (46), repeated for convenience below in (76).

(76) CONTEXTUALLY INFORMED COMPETITION

a. **Context:** *We are discussing which of the candidates voted for themselves.*

i. ✓ (Only) Hillary voted for herself.

ii. # (Only) Hillary voted for her

b. **Context:** *We are discussing which of the candidates voted for Hillary.*

i. ✓ (Only) Hillary voted for her.

ii. # (Only) Hillary voted for herself.

Our semantics gives a sentence like *(Only) Hillary voted for her* the three readings in (77): bound variable interpretation in (77a), coreference with a local antecedent in (77b), and disjoint reference with the local antecedent in (77c). At the same time, *(Only) Hillary voted for herself* may only have the bound variable reading in (77a).

(77) *(Only) Hillary voted for her.*

a. (Only) Hillary λx [x voted for x]

b. (Only) Hillary λx [x voted for Hillary]

c. (Only) Hillary λx [x voted for y] *where y is some relevant female*

Given the context in (76a), the intended interpretation is the bound variable one, making (77b) and (77c) incompatible with the context. (77a) is licensed by the context, but violates BE CLEAR! since the alternative with the reflexive *herself* in (76a-i) is a less ambiguous way of expressing (77a). As a consequence, (76a-ii) is infelicitous in the scenario in (76a). It is felicitious in (76b), however, because that context

does not block (77b), but (77a). Thus, BE CLEAR! obtains the intended result of the *Coreference Rule* and of *Rule I*.

With respect to logophoric reflexives in English, one stipulation of *ToC* and BE CLEAR! is that logophoric *-self* pronouns do not compete with regular pronouns in the same syntactic position. This assumption can be argued to fall out from the *ToC* and BE CLEAR! condition that the sentences these constraints may adjudicate between should have indistinguishable interpretations in a given context. According to Charnavel & Sportiche (2016), logophoric *himself / herself* are bound by a logphoric pronun, pro_{LOG}, which refers to the *logophoric* center, namely the attitude holder or the empathy locus (the participant in the event with whom the speaker identifies) of the given context. In this sense, logophoric pronouns might have a *different interpretation* than regular pronouns like *him/her*. If sentences with logophors and sentences with regular pronouns have *distinguishable interpretations*, they do not enter the BE CLEAR! competition, and BE CLEAR! will then not predict disjoint reference effects for non-reflexive pronouns. However, the question of whether regular pronouns can express logophoric meanings in the same contexts as their logophoric reflexive counterparts requires further research, so I restrict BE CLEAR! to only adjudicate between sentences which do not involve logophoric reflexives.

As illustrated in this section, BE CLEAR! can successfully account for binding and referential patterns which constraints like *Classic Principle B*, *Semantic Condition B*, *Rule I* and the *Coreference Rule* can only partially capture.[38] I do not stipulate that BE CLEAR! is the *only* constraint responsible for these patterns, and as we shall see in the next chapters, I argue that the competition modulated by BE CLEAR! is constrained by morpho-syntactic considerations.

The evidence in favor of BE CLEAR! comes from experimental work on the pro-

[38]The same goes for Safir (2004)'s *Form-To-Interpretation-Principle* and *Pragmatic Obivation*, which are also inspired by *Rule I* Reinhart (1983a, 2006) and Burzio (1989, 1991, 1996, 1998).

duction and comprehension of regular pronouns like *him* and *her* in Romanian, a language where Condition B effects do not obtain for pronouns. Before moving on to the psycholinguistic data, let us first review the pronominal system and pronominal referential patterns of Romanian.

2.4 The Romanian Pronominal System

Like its sister Romance languages Spanish and Italian, Romanian[39] is a null subject language, as illustrated in (78) below, where the subject *ea* is optionally overt.

(78) *(Ea$_1$) i$_2$ l$_3$- a prezentat (pe el$_3$) (lui$_2$).*
(she) DAT.CL MASC.ACC.CL has introduced (ACC him) (him.DAT)
'She introduced him to him.'

Romanian also makes use of a full paradigm of clitic pronouns which can code accusative[40] and dative arguments of the verb. The table in (79) lists all of the forms of regular pronouns and clitics in Romanian.[41]

[39]Romanian has free word order (Alboiu, 2002); some accounts take VSO to be the unmarked word order for Romanian (Dobrovie-Sorin, 1994; Sevcenco, 2006), but unmarked declarative sentences display both VSO and SVO word order, with SVO being more frequent (Pană-Dindelegan, 2013). Furthermore, Romanian is assumed to have V-to-T movement (Dobrovie-Sorin, 1994) and both postverbal and preverbal subjects, the latter of which are generally argued to be topics (e.g Cornilescu, 2000).

[40]The accusative case marker *pe* illustrated in (78) is analyzed as differential object marking in Romanian(Cornilescu, 2000).

[41]The table in (79) excludes the Genitive forms, which can be both pronominal and adjectival, and which vary depending on the morphological feature of the posessor and the possessum. Pronominal forms are also marked by an enclitic definite article, which also varies according to the gender of the posessum. These forms are listed below.

(i) GENITIVE PRONOUNS AND ADJECTIVES

	MASC.SG	FEM.SG	MASC.PL	FEM.PL
1ST.SG	*(al) meu*	*(a) mea*	*(ai) mei*	*(ale) mele*
2ND.SG	*(al) tău*	*(a) ta*	*(ai) tăi*	*(ale) tale*
3RD.MASC.SG	*(al) lui*	*(a) lui*	*(ai) lui*	*(ale) lui*
3RD.FEM.SG	*(al) ei*	*(a) ei*	*(ai) ei*	*(ale) ei*
1ST.PL	*(al) nostru*	*(a) noastră*	*(ai) noştri*	*(ale) noastre*
2ND.PL	*(al) vostru*	*(a) voastră*	*(ai) voştri*	*(ale) voastre*
3RD.PL	*(al) lor*	*(a) lor*	*(ai) lor*	*(ale) lor*

(79) ROMANIAN PRONOMINAL INVENTORY

	NOMINATIVE	ACCUSATIVE		DATIVE	
		PRONOUN	CLITIC	PRONOUN	CLITIC
1ST.SG	*eu*	*mine*	*mă, m-*	*mie*	*îmi, mi-*
2ND.SG	*tu*	*tine*	*te*	*ţie*	*îţi, ţi-*
3RD.MASC.SG	*el*	*el*	*îl, l-*	*lui*	*îi, i-*
3RD.FEM.SG	*ea*	*ea*	*o*	*ei*	*îi, i-*
1ST.PL	*noi*	*noi*	*ne*	*nouă*	*ni, ne*
2ND.PL	*voi*	*voi*	*vă*	*vouă*	*vi, v-*
3RD.PL.MASC	*ei*	*ei*	*îi, i-*	*lor*	*le*
3RD.PL.FEM	*ele*	*ele*	*le, li*	*lor*	*le, li*

Clitic doubling of direct and indirect objects is mandatory in Romanian, when the referents of these objects are animate (Tigău, 2015). The sentence in (78) also illustrates that clitic pronouns are optionally resumed by an overt direct or indirect object. Pronominal direct and indirect objects, may be expressed either via null (78) or overt pronouns (80). Clitics constrain the reference of these pronouns. Either personal pronouns, like *el*, reflexive pronouns, like *sine*, or emphatic reflexives like *el însuşi* may double a reflexive clitic, as shown in (80a) below.

(80) a. ***Lockhart***$_1$ **(se*$_{1/*2}$*) admiră pe* ***el***$_{1/*2}$ / ***sine***$_{1/*2}$ / ***el*** ***însuşi***$_{1/*2}$
Lockhart REF.CL admires ACC him / SELF / him himself
'Lockhart admires himself'.

b. ***Lockhart***$_1$ **(îl*$_{2/*1}$*)* *admiră pe* *el*$_{2/*1}$ / **sine*$_1$ / **el* *însuşi*$_{*1}$.
Lockhart MASC.ACC.SG.CL admires ACC him / SELF / him himself
'Lockhart admires him'.

However, only personal pronouns may double non-reflexive clitics. If the clitic is non-reflexive, as in (80b), then disjoint reference between the subject and *el* is

mandatory: *Lockhart* must admire some other man. If the clitic is reflexive, like in (80a), *Lockhart* and *el* necessarily refer to the same entity.

As illustrated above, clitics can be either reflexive or non-reflexive, and the Romanian pronominal inventory also includes 3rd person reflexive pronouns like *sine*, as well as emphatic reflexives like *el însuşi*. The reflexive pronoun is incompatible with plural referents (Sevcenco, 2006), as shown in (81).[42]

(81) a. *Narcisistul se admiră pe sine.*

narcissist.DEF REFL.CL admires ACC REFL
'The narcissist admires himself.'

b. **Narcisiştii se admiră pe sine.*

narcissists.DEF REFL.CL admire ACC REFL
'The narcissists admires themselves.'

Therefore, while the reflexive clitic *se* can be used for both singular and plural referents, the reflexive pronoun *sine*, the only simplex reflexive in Romanian, is in fact merely a 3rd person singular reflexive which does not vary with respect to gender, person or number. The emphatic reflexive, however, agrees with the ϕ-features of its referent and is fully morphologically specified for all ϕ-features. The tables below list the forms of the 3rd person reflexive and of the emphatic reflexive forms available in Romanian.

(82) **3rd person reflexive pronouns**

	ACCUSATIVE		DATIVE	
	PRONOUN	CLITIC	PRONOUN	CLITIC
MASC / FEM	*sine*	*se, s-*	*sie, sieşi*	*îşi, şi-*

[42]Sevcenco (2006) argues that for *some* speakers, *sine* also allows for long distance binding in some contexts. However, as illustrated in her experimental results, long-distance binding of *sine* is not standard, and rarely accepted. Based on my own judgments and on those of 5 other native speakers of Romanian, I do not assume that *sine* is a long distance reflexive.

(83) **Emphatic Reflexives**

	NOMINATIVE	ACCUSATIVE	DATIVE
1ST.SG.MASC	*eu însumi*	*mine însumi*	*mie însumi*
1ST.SG.FEM	*eu însămi*	*mine însămi*	*mie însemi*
2ND.SG.MASC	*tu însuţi*	*tine însuţi*	*ţie însuţi*
2ND.SG.FEM	*tu însăţi*	*tine însăţi*	*ţie înseţi*
3RD.MASC.SG	*el însuşi*	*el însuşi*	*lui însuşi*
3RD.FEM.SG	*ea însăşi*	*el însăşi*	*ei înseşi*
1ST.PL.MASC	*noi înşine*	*noi înşine*	*nouă înşine*
1ST.PL.FEM	*noi însene*	*noi însene*	*nouă însene*
2ND.PL.MASC	*voi înşivă*	*voi înşivă*	*vouă înşivă*
2ND.PL.FEM	*voi însevă*	*voi însevă*	*vouă însevă*
3RD.PL.MASC	*ei înşişi*	*ei înşişi*	*lor înşişi*
3RD.PL.FEM	*ele însele*	*ele însele*	*lor înseşi*

2.4.1 Clitic Competition

The data presented so far suggests that, in Romanian, reflexive clitics are necessarily subject-oriented, while non-reflexive clitics are anti-subject oriented. This is also evinced below. The only possible referent for reflexive clitics is the surface subject of the same clause: (84a) and (84b) illustrate the reflexive clitic cannot take a non-local subject as an antecedent, and that reflexive clitics cannot be logophoric or long-distance bound. In (84b), there are two reflexive clitics, both necessarily referring to *Trump*. In (84c), while there is no accusative reflexive clitic due to the fact that the sentence is in passive voice, the dative reflexive clitic must take the passive subject as an antecedent.

(84) a. *Ron*$_1$ *a spus că* ***Lockhart***$_2$ ***s***$_{2/*1}$- *a lăudat.*

Ron has said that Lockhart REFL.CL.ACC has praised.
'Ron said that Lockhart praised himself.'

b. *Hillary a spus că* ***Trump***$_1$ ***şi***$_1$ ***s***$_1$- *a descris.*

Hillary has said that Trump DAT.REFL.CL ACC.REFL.CL has described
'Hillary said that Trump described himself to himself.'

c. ***Trump***$_1$ ***şi***$_1$- *a fost descris* (***sieşi***$_1$) (*de către sine*).

Trump DAT.REFL.CL has been described (self.DAT) (by self)
'Trump was described to himself (by himself)'.

d. ***Lockhart***$_2$ *lui Ron*$_1$ i$_1$ **s**$_{2/*1}$-*a lăudat.*

Lockhart DAT Ron DAT.CL.M REFL.CL.ACC has praised.
'Lockhart praised himself to Ron.'

The Romanian reflexive clitic is a 'well-behaved' Condition A obeying anaphor, which is necessarily bound by a c-commanding DP in an argument position. Intervening c-commanding elements — via scrambling, for instance, as in (84d) — cannot serve as antecedents for the reflexive clitic. This fact substantiates the claim that reflexive clitics are subject-oriented.

Furthermore, the reflexive clitic *se* is exclusively bound by 3rd person subjects. As shown below, *se* cannot be used to refer to 1st or 2nd person antecedents.

(85) a. **Eu*$_1$ *se*$_1$ *admir* (*pe mine*$_1$).

I REFL.CL admire.1ST.SG ACC me
'I admire myself'.

b. **Tu*$_1$ *se*$_1$ *admiri* (*pe tine*$_1$).

you REFL.CL admire.2ST.SG ACC me
'You admire yourself'.

While both 3rd person pronominal and reflexive clitics can be resumed by pronouns, their roles are clear-cut in Romanian: reflexive clitics encode binding or coreference with the local subject, as in (86), while pronominal clitics, as in (87) necessarily give rise to disjoint referent interpretations.

(86) LOCAL COREFERENCE

a. ***Trump***$_1$ ***se***$_1$ *iubeşte (pe* ***el***$_1$*).*

Trump REFL.CL loves ACC him

b. ***Trump***$_1$ ***se***$_1$ *iubeşte (pe* ***sine***$_1$).

Trump REFL.CL loves ACC self
'Trump loves himself.'

(87) DISJOINT REFERENCE

a. *Trump*$_1$ *îl*$_{2/*1}$ *iubeşte (pe* *el*$_{2/*1}$*).*

Trump MASC.CL loves ACC him

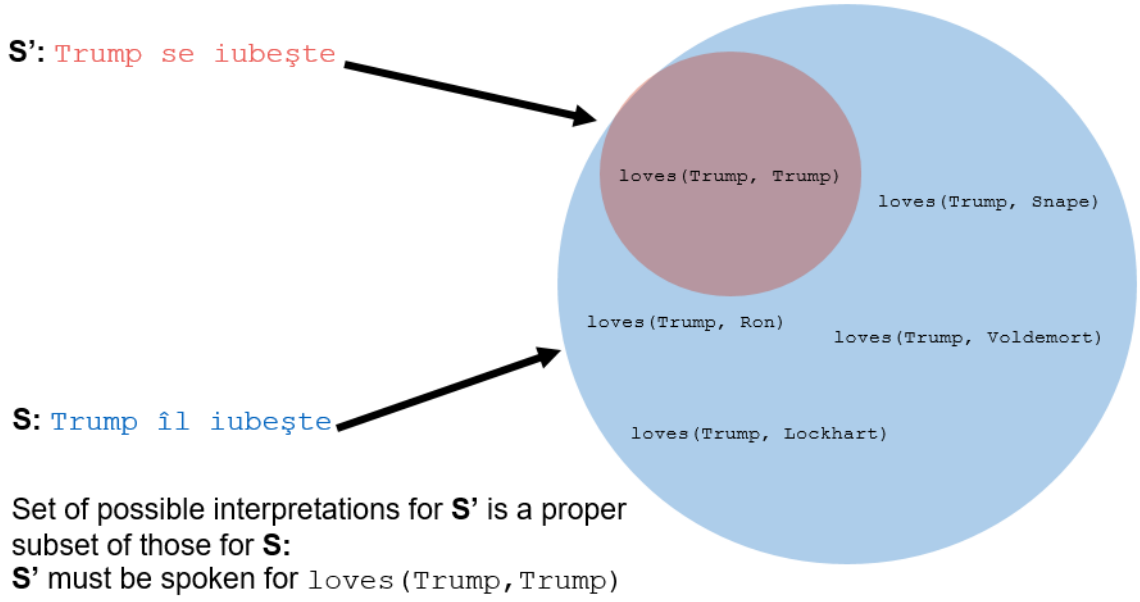
b. *Trump*$_1$ *îl*$_{2/*1}$ *iubeşte (*pe* *sine*$_1$*).*

Trump MASC.CL loves ACC self
'Trump loves him.'

I will argue that BE CLEAR! is responsible for the distribution of reflexive and pronominal clitics in Romanian. Assuming that pronominal clitics could also be bound by local subjects, (87a) would have two possible interpretations: *Trump loves himself* and *Trump loves some other man*. However, given that reflexive clitics are Condition A obeyors, (86a) only has the former reading, therefore the set of possible interpretations for (86a) is a proper subset of the interpretations of the alternative (87a). Their set/subset interpretation relations are schematized in (88) below. According to BE CLEAR!, in a context where the two sentences would express the same reading, namely that *Trump loves himself*, (86a) would be chosen. The BE CLEAR! constraint only allows for (87a) to be chosen in a context where the

intended meaning is not a reflexive one. Therefore, (87a) is only used to express disjoint reference.

(88) *Interpretations for (86a) and (87a)*



As we saw in *Section 2.3.2*, an initial argument in favor of the assumption that competition gives rise to disjoint reference effects comes from 1st and 2nd person clitics. Romanian does not have a specialized reflexive pronoun or clitic for 1st and 2nd person persons; thus, there is no competition for BE CLEAR! to adjudicate, and the same form can be used to render both disjoint reference and local coreference readings.

(89) LOCAL COREFERENCE

a. ***Eu***$_1$ *mă*$_1$ *iubesc* (*pe* ***mine***$_1$).
I 1ST.ACC.CL love ACC me
'I love myself.'

b. ***Tu***$_1$ *te*$_1$ *iubeşti* (*pe* ***tine***$_1$).
you 2ND.ACC.CL love ACC you
'You love yourself.'

(90) DISJOINT REFERENCE

a. *Trump*$_1$ *mă*$_{2/*1}$ *iubeşte* (*pe mine*$_{2/*1}$).
Trump 1ST.ACC.CL loves ACC me
'Trump loves me.'

b. *Trump*$_1$ *te*$_{2/*1}$ *iubeşte* (*pe tine*$_{2/*1}$).
Trump 2ND.ACC.CL loves ACC you
'Trump loves you.'

Thus, BE CLEAR! accurately predicts the necessarily disjoint reference effects of 3rd person pronominal clitics based on the assumption that the 3rd person reflexive clitic *se* obeys Condition A, as well as the fact that 1st and 2nd person pronouns and clitics may express both reflexive and disjoint reference readings. Furthermore, BE CLEAR! also predicts that the sentences in (91) should all be viable options of rendering the bound variable meaning below.

(91) a. ***Ron***$_2$ ***s***$_2$- *a* *ajutat* ∅. NULL
Ron REFL.CL has helped *pro*

b. ***Ron***$_2$ ***s***$_2$- *a* *ajutat* *pe* ***el***$_2$. REGULAR PRONOUN
Ron REFL.CL has helped ACC him

c. ***Ron***$_2$ ***s***$_2$- *a* *ajutat* *pe* ***el*** ***însuşi***$_2$. EMPHATIC REFLEXIVE
Ron REFL.CL has helped ACC him himself

d. ***Ron***$_2$ ***s***$_2$- *a* *ajutat* *pe* ***sine***$_2$. REFLEXIVE PRONOUN
Ron REFL.CL has helped ACC SELF
'Ron helped himself.'

The alternatives in (91) have indistinguishable meanings - they all express a bound variable relation.[43] Since there are no differences in meaning, then BE CLEAR! will

[43]The felicity of these particular constructions is not affected by the *de se/de re* status of the scenario. The *se* clitic itself does not seem to be read necessarily *de se*: the clitic does not track acquain-

not affect the acceptability of any of the utterances above. According to BE CLEAR! each of the constructions 'wins', and they can all be felicitously used in a neutral context. [44]

In sum, BE CLEAR! accurately predicts the reference patterns of clitics and object pronouns in transitive predicates. The reason for this neat distribution, however, is that the object pronouns necessarily refer to the same entity as the clitic they double. Thus, in particular, BE CLEAR! is accurate with respect to the interpretations of Romanian clitics. In a situation where there are no competitors, like for 1st and 2nd person clitics, there is no competition, consequently, these 1st and 2nd person clitics are used to express both reflexive and non-reflexive readings. With respect to 3rd person clitics, the competition is only between two alternatives: reflexive clitics and non-reflexive clitics. Given that reflexive clitics obey Condition A and are thus necessarily bound, they can express a proper subset of the range of meanings that non-reflexive clitics might have. BE CLEAR! then, predicts the division of labor between the two clitics, with non-reflexive clitics becoming specialized for disjoint reference readings. The question at this point, however, is whether BE CLEAR! can make accurate predictions when more than two alternatives are available. For this reason, we now turn to prepositional phrases in Romanian.

2.4.2 The PP puzzle

Objects of prepositional phrases are not clitic-doubled in Romanian, since Romanian has no oblique clitics. Therefore, the interpretation of PP objects is not disambiguated by a clitic exponent, as in the case of (di)transitive constructions. Non-reflexive personal pronouns, like in (92a), can be assigned both local and disjoint

tance relations. Based on communication with Dominique Sportiche (p.c.), the same seems to be true in French. When looking at control structures, the reflexive clitic is once again immune to the context itself; the pronominals, however, are not.

[44] When turning to plural referents, however, some of these constructions get specialized readings (distributive, reciprocal, etc.), along the lines of Cable (2014), which BE CLEAR! can capture.

reference interpretations. All the sentences in (92) are felicitous in a context where Rita is talking about Rita.

(92) a. *Rita*$_1$ *hodorogeşte* ***despre ea***$_{1/2}$.
Rita yaps about her

b. *Rita*$_1$ *hodorogeşte* ***despre sine***$_{1/*2}$.
Rita yaps about self

c. *Rita*$_1$ *hodorogeşte* ***despre ea însăşi***$_{1/*2}$.
Rita yaps about her herself
'Rita is yapping about herself'.

The same judgments hold for sentences with QP subjects, as illustrated below.

(93) a. *Nici o reporteriţă*$_1$ *nu hodorogeşte* ***despre ea***$_{1/2}$.
not a reporter.FEM not yaps about her

b. *Nici o reporteriţă*$_1$ *nu hodorogeşte* ***despre sine***$_{1/*2}$.
not a reporter.FEM not yaps about self

c. *Nici o reporteriţă*$_1$ *nu hodorogeşte* ***despre ea însăşi***$_{1/*2}$.
not a reporter.FEM not yaps about her herself
'No reporter is yapping about herself'.

These sentences are problematic for *Binding Theory* accounts in the following ways. Firstly, with respect to *Classic Binding Theory*, Büring (2005)'s *Condition B* disallows the binding of a pronoun in its coargument domain. In Büring (2005)'s account, the preposition *despre* 'about' is semantically inert: the pronoun receives its θ-role from the verb. Consequently, (92a) is a *Condition B* violation. Given that *ea* can be bound by a quantified phrase, like *no reporter*, the quantified subject equivalent of (92a) in (93a) is also a *Semantic Condition B* violation.

Secondly, *Rule I* and the *Coreference Rule* do not distinguish between binding alternatives if all of the alternatives in question include bound variable relations

— this task is assigned to *Semantic Condition B*. Consequently, *Rule I* and the *Coreference Rule* predict that all of the sentences in (92) should be equally acceptable, irrespective of context, by virtue of the fact that they all convey a bound variable reading. This is true in the neutral context assumed in (92), however, as we shall see below, context *does* play a role in adjudicating between the alternatives in sentences like (92).

Thirdly, a critical cross-linguistic prediction of morphosyntactic competition based accounts (Safir, 2004; Rooryck & vanden Wyngaerd, 2011; Safir, 2014) is that disjoint reference effects obtain for regular pronouns like *her* if the language has a *dedicated reflexive form* that could have been used in the same syntactic position. Although, in these accounts, complex emphatic reflexives are assumed *not* to compete with regular pronouns, as we shall see in more detail in *Chapter 4*, the reflexive *sine* would count as a *dedicated reflexive form* for 3rd person singular referents, like *Rita*, given that it is an anaphor which obeys Condition A. Consequently, the pronoun *ea* is wrongly predicted to *not* have a bound variable reading in (92a). I discuss evidence against these approaches in *Chapter 3*, and I provide further arguments against Rooryck & vanden Wyngaerd (2011) in the *Appendix*.

Lastly, the sentences in (92) also pose a problem for pragmatic competition based accounts in general, but also to BE CLEAR!. According to BE CLEAR!, the interpretations associated with (92b) and (92c) (namely, *Rita* λx *[x is talking about x]*) are a proper subset of those associated with (92a), which can also have a disjoint reference reading. In this case, BE CLEAR! would wrongly predict that (92c) and (92b) would always 'win' over (92a).

Therefore, the fact that regular personal pronouns like *ea* in (92a) can express both a bound variable reading as well as disjoint reference is a puzzle for all of the *Binding Theory* approaches discussed in this chapter, including the pragmatic constraint proposed in *Section 2.3.3*, BE CLEAR!. The task at hand is understanding

why BE CLEAR! can account for the interpretation of 1st and 2nd person pronouns as well as clitics in Romanian, but is insufficient when it comes to object pronouns which are not clitic doubled. Under the assumption that these pronominal forms compete, and that this competition is modulated by BE CLEAR!, what other factors come into play in the production and comprehension of pronominal forms?

2.4.3 The search for BE CLEAR!

Some evidence that BE CLEAR! constrains the competition between regular pronouns, reflexives and emphatic reflexives in PP object position comes from the bound variable scenario discussed for German in *Section2.3.2*. This scenario, as well as the German and Romanian judgments are given in (94) below.

(94) **Context:** *Ava, Beth and Claire went voting yesterday. Ava voted for Beth, Beth for Claire, and Claire for herself. Later, Dorothy asks Alex whether Claire voted, and Alex replies: yes, but...*

a. **Nur sie$_1$ λ$_1$ t$_1$ hat für sie$_1$ gestimmt.* GERMAN

only she has voted for her
'Only she voted for her.'

b. *Nur sie$_1$ λ$_1$ t$_1$ hat für sich$_1$ gestimmt.* GERMAN

only she has voted for self
'Only she voted for herself.'

(Dillon & Johnson, 2019, ex. (43-44), p. 7, 09/17/19)

c. *#Doar ea$_1$ a votat pentru ea$_1$.* ROMANIAN

only she have voted for her
'*Only she voted for her.'

d. *Doar ea$_1$ a votat pentru sine$_1$ / ea însăşi$_1$.* ROMANIAN

only she have voted for self / her herself
'Only she voted for herself.'

In a *neutral context,* (94c), unlike its German counterpart in (94a), is ambiguous between three readings: a disjoint reading, a coreferential reading and a bound variable reading. However, in the context above, (94c) is not felicitous. This context[45] disallows for a coreferential reading of the 3rd person pronoun, since *Claire*, the referent of German *sie* and Romanian *ea*, has been voted for by someone other than herself, as well. At the same time, the only available reading for (94d), as well as the German (94b), is a bound variable reading. Therefore, in this particular context, the pronoun *ea* is ambiguous between a felicitous reading, and a reading which is purposefully excluded by this scenario, namely the coreferential reading. Given that the reflexive *sine* and the emphatic *ea însăşi* only allow for the intended bound variable reading, BE CLEAR! correctly ranks (94d) above (94c).

The observation is that in terms of the competition between pronominal and reflexive clitics in Romanian, as well as that of non-logophoric reflexive pronouns and regular pronouns in English, as discussed in *Section 2.3.3*, BE CLEAR! leads to grammaticized preferences: in positions where a Romanian reflexive clitic or an English reflexive pronoun would have been available, non-reflexive clitics and English non-reflexive pronouns may not express a bound variable reading. There is a difference, then, between how BE CLEAR! affects these competitions, and how it comes into play with respect to pronominal expressions in non-clitic doubled positions in Romanian. In the latter, the interpretations are not grammaticized, although, as illustrated in (94), BE CLEAR! does have an effect in these environments. In order to refine our assumptions about constraints on reference, and in particular, how these constraints operate in Romanian, the task at hand is understanding why (92a) survives, despite BE CLEAR! disfavoring this alternative. For this reason, I use data from two production and two comprehension experiments to investigate the effects of BE CLEAR! on the competition between the three pronominal forms

[45]Designed by Kyle Johnson.

in (92).

Chapter 3 provides experimental evidence from production supporting a role for BE CLEAR! in the pronominal choices speakers make in Romanian. The experimental data also shows that, in unambiguously reflexive contexts, speakers have a slight preference towards regular pronouns *el/ea* 'him/her' as opposed to the more complex emphatic reflexives. Based on the empirical facts, in *Chapter 3* I further extend the proposal by introducing a syntactic economy based constraint, BE SMALL!, which ranks less syntactically complex forms over more complex ones.

Other than providing the evidence needed for the refinement of the analysis of pronominal reference in Romanian, the experiments discussed in *Chapter 3* also bridge the theoretical and the psycholinguistic literature. BE CLEAR! is an implementation of pragmatic accounts which view the selection of a reflexive over a regular pronoun as a matter of *ambiguity avoidance*. In parallel, the psycholinguistic literature provides evidence that *ambiguity avoidance* plays a role in production, with respect to pronouns targeting a referent from a previous sentence. *Chapter 3* merges these two literatures and tests the hypothesis that the production of pronouns targeting an intrasentential referent is also affected by *ambiguity avoidance*.

In *Chapter 4*, I discuss the results from the comprehension experiments, which show that the expected preference for bound variable readings predicted by constraints like *Rule I* and the *Coreference Rule* does not hold, at least in Romanian. Given that there is no preference for interpreting ambiguous pronouns as disjoint in reference from a local antecedent, which would have been expected under a purely pragmatic account, the data also aligns with the view that BE CLEAR! is not the *only* constraint which impacts the interpretation of pronominal forms.

Furthermore, *Chapter 4* also provides evidence, contra Safir (2004) and Rooryck & vanden Wyngaerd (2011), that emphatic reflexives *do* compete with regular pronouns in the same syntactic position, as assumed by BE SMALL! and BE CLEAR!,

and that, when the availability of the *emphatic reflexive* form is increased, comprehenders opt for disjoint reference readings of regular pronouns more often.

In sum, the experimental evidence overviewed in the chapters to come indicates that: (i) there is competition between pronominal forms in PP object position including between emphatic reflexives and regular pronouns; (ii) this competition is modulated by a number of constraints; (iii) one pragmatic constraint, BE CLEAR! regulates this competition by preferring the least ambiguous form; (iv) other constraints might reflect different pressures, from syntactic economy to pronominal form frequency; (v) the interpretation and use of pronominal forms is *jointly* determined by pragmatic and morphosyntactic constraints.

CHAPTER 3

PRONOUN PRODUCTION

As discussed in *Chapter 2*, the main puzzle that remains to be addressed is why a pragmatic constraint like BE CLEAR! leads to grammaticized interpretations in the case of Romanian clitics, but not in the case of non-clitic doubled regular pronouns. To determine the extent to which BE CLEAR! is active in the case of regular pronouns in prepositional phrase object position, we turn to the production of pronouns in these syntactic environments. Is there evidence that BE CLEAR! impacts the choice of pronominal forms in PP object position in Romanian?

The choice between reflexive and regular pronouns in a given syntactic and discourse context is couched in an important larger question, namely: how do speakers choose between different referring expressions? There is psycholinguistic evidence that the more *accessible* (or *prominent*) a referent, the more likely it is that it will be pronominalized, whereas more complex expressions are preferred for less accessible antecedents (Givón, 1983; Ariel, 1990; Gundel et al., 1993; Grosz et al., 1995; Arnold, 1998; Fukumura & van Gompel, 2015). One factor that affects the accessibility of any given referent, among others, concerns *contextual ambiguity*. There is a number of studies which show that *ambiguity avoidance* strategies affect the production rate of pronouns in cross-sentential contexts (Arnold et al., 2000; Fukumura & van Gompel, 2010; Fukumura et al., 2011, a.o).

Despite the large body of work in the psycholinguistic literature concerning the production of pronouns referring to antecedents in a previous sentence, it is yet unknown whether speakers employ ambiguity avoidance strategies when these pronouns refer to a clausemate antecedent. This gap in the psycholinguistic literature is especially surprising given that, as discussed in *Chapter 2* the theoretical literature on pronominal reference has featured ambiguity avoidance ever since Bolinger (1979), and more prominently, Dowty (1980) and Levinson (1987).

The investigation of the effect of *ambiguity avoidance* on intrasentential pronoun production is a straightforward extension of existing psycholinguistic work on cross-sentential contexts and of the well established theoretical intuition that a pragmatic principle regulates the choice between reflexive and non-reflexive pronouns in ambiguous contexts. At the same time, it is perhaps understandable that this extension is lacking in the literature given the fact that within sentence choices are normally not that variable, as they are dominated by strict grammatical principles, such as the binding constraints. The production literature also assumes a division of labor between intrasentential and cross-sentential reference. According to Almor & Nair (2007), the choice of reference across sentences reflects preferences, while reference to a clausemate antecedent is governed by syntactic constraints.

Reinhart (1983b, 2006); Roelofsen (2010, etc.) argue that only *coreference* with *referential subjects* is under the purview of pragmatic considerations. By assumption, the bound variable interpretation of pronouns targeting quantified antecedents is restricted by syntactic constraints - Condition B: binding is prohibited syntactically, coreference is dispreferred post-syntactically. In this sense, although there are theoretical grounds to expect that ambiguity avoidance strategies might impact the choice of pronominal expressions in the case of *coreference*, it is not predicted that a similar ambiguity avoidance effect should obtain for bound variable relationships. On the other hand, BE CLEAR! predicts that ambiguity avoidance should be

observed for pronouns targeting both referential and quantificational antecedents.

The two production experiments reported in this chapter quantify the distribution of pronominal choice for locally bound and disjoint pronouns, for both *referential (Experiment 1)* and *quantified subject antecedents (Experiment 2)*. The 'ambiguity' factor is controlled for by manipulating whether all mentioned antecedents had matching, or mismatching gender (Arnold, 2010). The experimental results support pronominal competition: Romanian speakers preferred to use regular pronouns in coreference, bound variable and disjoint reference interpretations alike in unambiguous contexts. However, whenever a pronoun was potentially ambiguous in context, speakers showed an ambiguity avoidance strategy, using reflexives or names more often than in the unambiguous conditions. Crucially, these results also show that the pragmatic principle which regulates the choice of a pronoun applies to local binding and coreference alike: the same patterns hold for both types of antecedent-pronoun relations, as expected under BE CLEAR!.

This chapter is organized as follows. *Section 3.1* lays out the assumptions of the two production experiments, briefly summarizing the findings from the psycholinguistic literature on pronoun production in *3.1.1*, and sketching the background of the relevant theoretical literature on (co)reference in *3.1.2*; *subsection 3.1.3* provides a short overview of the relevant Romanian facts concerning pronouns, and *subsection 3.1.4* outlines the overall hypothesis and predictions for the production study. The second section, *3.2*, describes *Experiment 1*, the production task with referential subjects, section *3.3* outlines *Experiment 2*, the production task with the quantified subjects, and, finally, the fourth section, *3.4*, compares the results of the two experiments and discusses the main findings.

3.1 Experimental Assumptions

The two production experiments in this chapter ask whether the choice between regular pronouns like *him* and reflexive pronouns like *himself* is consistently impacted by contextual ambiguity in disjoint reference, coreference and bound variable environments, as predicted by the proposed pragmatic constraint in *Chapter 2,* BE CLEAR!. These experiments were conducted on Romanian, which, as discussed in *Section 2.4*, is a language with a rich pronominal system allowing for constructions where the regular pronoun *him/her* would be ambiguous between a reflexive and a non-reflexive interpretation. I build upon findings from the psycholinguistic literature regarding cross-sentential pronoun production and hypotheses regarding the effect of pragmatic context from the theoretical literature on the Binding Theory. This section lays out the main assumptions of the production study, bridges the psycholinguistic and theoretical literature, and sets the stage for the discussion of each experiment.

3.1.1 Pronoun Production

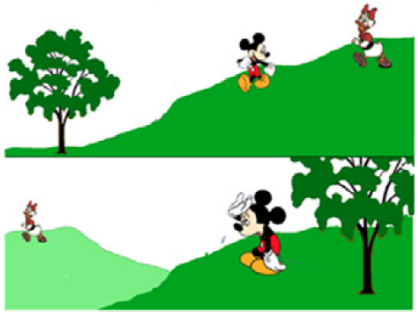
Establishing reference is a key part of discourse in natural language: speakers typically set up referents and then refer back to them, either in the same sentence or across sentences in any given discourse. The question of how speakers choose between different referential expressions has also been addressed in production studies in the psycholinguistic literature. The notion of competition between different referring expressions is not new. Olson (1970) argues that the identification of an intended referent is "relative to the set of alternatives" (Olson, 1970, p. 272) in a given context. This intuition, alongside the Grice (1975) cooperative principle that speakers design utterances so as to be maximally informative to their addressees, is often referred to in the production literature as the *audience design hypothesis*. Un-

der the assumption that speakers aim for addressees to understand their references (Ariel, 1990; Gundel et al., 1993; Almor & Nair, 2007; Arnold, 2010; Ferreira, 2019, a.o.), there is evidence that more complex definite descriptions tend to be used more often in *ambiguous contexts*. For instance, studies have found that in a context where two referents overlap in some features, like one where there are two apples, one green and one red, speakers tend to avoid using an ambiguous DP, such as *the apple*, and prefer more explicit referential competitors, like *the green apple* (Givón, 1983; Ariel, 1990; Nadig & Sedivy, 2002, a.o.).

There is also a great deal of evidence (Ferreira & Dell, 2000; Schafer et al., 2000; Snedeker & Trueswell, 2003; Ferreira et al., 2005) that speakers employ *ambiguity avoidance* strategies when they are *attentive* to potential competitors in the discourse. Zooming in on the competition between pronouns and more complex definite descriptions, experimental research has shown that speakers use fewer pronouns to refer to a cross-sentential antecedent when the use of this pronoun would lead to ambiguity (Arnold, 1998; Arnold et al., 2000; Fukumura & van Gompel, 2010; Fukumura et al., 2011, a.o.). To illustrate, consider the following experiment from an Arnold & Griffin (2007) study. In this experiment, participants were asked to continue a story based on a two-panel cartoon featuring well known animated characters. Participants would be provided with a cartoon and with a leading sentence to describe the events, as in (95) below.

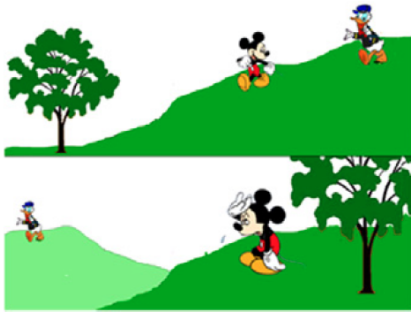
(95) *Sample Item from Arnold & Griffin (2007)*

a. DIFFERENT GENDER CONDITION



Mickey went for a walk with Daisy in the hills the other day.

b. SAME GENDER CONDITION



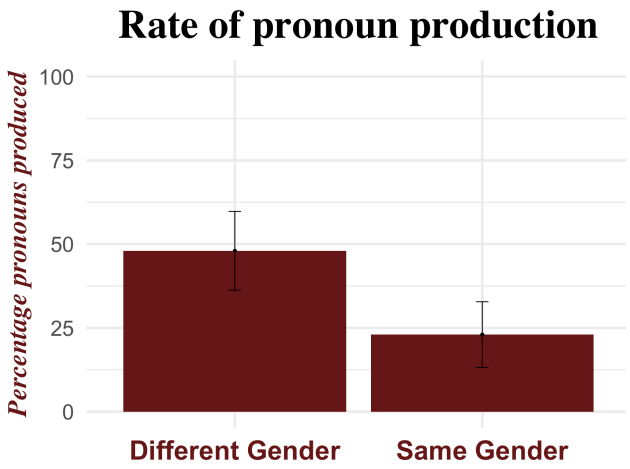
Mickey went for a walk with Donald in the hills the other day.

The cartoon in (95a) centers around *Mickey Mouse*, who is male, and *Daisy Duck*, who is female, and the leading sentence describes the first panel: one where Mickey and Daisy are shown going for a walk in the hills. The experimental task is for participants to continue the story by describing the lower panel, which in the case of (95) indicates that Mickey is tired. By manipulating the gender of the second character in the given picture, two conditions were created: DIFFERENT GENDER (with Mickey and Daisy, in (95a)) and SAME GENDER (with Mickey and Donald, in (95b)). Arnold & Griffin (2007) were interested in knowing how often participants would refer to Mickey by means of a pronoun, and whether the pronoun production rate would be affected by contextual ambiguity. For instance, possible continuations to this scenario, based on the cartoon in the lower panel, could be *He got tired* or *Mickey got tired* (among many others). Whereas the sentence with the pronoun *he* would be unambiguous in the DIFFERENT GENDER condition, it could lead to ambiguity in the SAME GENDER condition.

With respect to the continuations produced by the participants, by analyzing the sentences in which the first character referred to is Mickey and comparing how often speakers used a name (like *Mickey*) and how often they used a pronoun (like *he*), Arnold & Griffin (2007) established the production rate of pronouns in the two conditions. In the DIFFERENT GENDER condition, participants produced a sentence

with a pronoun 48% of the time. In the SAME GENDER CONDITION, participants produced a sentence with a pronoun 23% of the time. These results, depicted in the graph in (96) below, illustrate a significant ($p < 0.001$) ambiguity effect.

(96) *Arnold & Griffin (2007) ambiguity avoidance results*

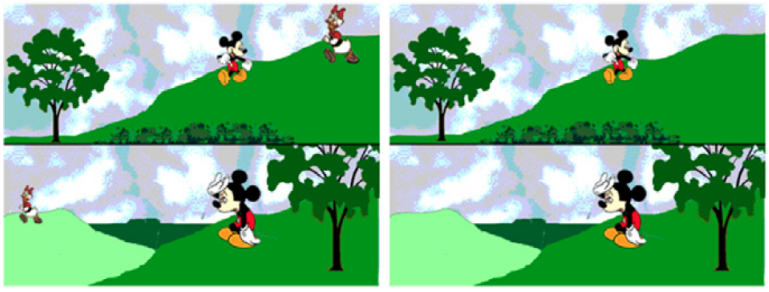


As Arnold & Griffin (2007) point out, the effect observed in (96), however, need not necessarily be taken as an argument in favor of *audience design*. Fukumura & van Gompel (2012), for instance, provide evidence that in production, a speaker considers the *accessibility* of a referent in *their own* discourse model, as opposed to their addressee's. In other words, in the case of repeated reference, when choosing between different definite descriptions to refer to an antecedent introduced in a previous sentence, speakers reserve pronouns for *accessible* or *prominent* referents (Givón, 1983; Gundel et al., 1993; Grosz et al., 1995; Arnold, 1998, a.o.). Arnold (2010) identifies four factors that contribute to *accessibility*: givenness, recency, syntactic prominence, and thematic prominence. Previous studies have shown that pronouns are more frequently used when: referents had already been *given*, or introduced in the discourse (Prince, 1981), they had been more *recently* mentioned (Givón, 1983; Ariel, 1990; Arnold, 1998), the referents are in *subject* position (Arnold, 2001; Arnold et al., 2000; Fukumura & van Gompel, 2010) or topicalized (Ariel, 1990; Walker et al., 1994; Grosz et al., 1995), and when the referents are themati-

cally prominent (Stevenson et al., 1994)[1]).

Arnold & Griffin (2007) also argue that ambiguity avoidance effects may be due to the speaker's own discourse representation, and not evidence in favor of audience design. As shown above, Arnold & Griffin (2007) replicate the ambiguity avoidance effect reported in previous literature; however, they also show that the presence of an additional character in the discourse, irrespective of their gender, leads to the use of fewer pronouns. This finding lends further support to the hypothesis that the *accesssibility* of a referent in the speaker's mental representation is an important factor in the choice of a referring expression.

(97) *Examples of visual stimuli from the main study in Arnold & Griffin (2007)*



The sample stimuli in (97) exemplify the two conditions of interest in the main study of Arnold & Griffin (2007). The cartoon on the left, with Mickey and Daisy, represents the two character context, and the one on the right illustrates the single character context. The results indicate a significant difference between the two conditions: on average, participants produced 46% more pronouns in the single-character context than in the two-character context. The authors conclude that the *two-character effect* (Arnold & Griffin, 2007, p. 532) stems from a speaker internal constraint, and not from consideration to their listener's discourse model, since the use the pronoun *he* in either context would have been unambiguous.

Irrespective of whether this effect is a matter of speaker-internal constraints or

[1]Referents introduced as a Stimulus argument were more often pronominalized than those introduced as Goals or Sources.

of speaker-hearer considerations, there is psycholinguistic evidence that speakers use less pronouns *across sentences* when it comes to ambiguous contexts. A question that immediately arises at this point, then, is whether speakers employ ambiguity avoidance strategies when they refer to clausemate antecedents. Given the grammatical constraints which are assumed to operate on pronouns targeting intrasentential antecedents, it is not obvious that the ambiguity avoidance effect should extend to Condition B environments. Furthermore, experimental evidence shows that speakers do not *always* avoid syntactic ambiguity, like garden path sentences (Arnold et al., 2004; Ferreira & Hudson, 2011; Ferreira & Schotter, 2013; Jaeger, 2010). Nevertheless, the investigation of pronominal reference in Romanian is not only relevant to the psycholinguistic literature, by extending the existing work on pronoun production, but also to the theoretical literature on the Binding Theory.

3.1.2 Pronouns in Competition

Even though there is little to no experimental evidence in favor of ambiguity avoidance strategies being employed at the intrasentential level, there is a considerable body of work in the theoretical literature on pronominal reference which mirrors this hypothesis. As we saw in the previous chapter, inspired by Grice (1975), Dowty (1980) suggests that reflexive pronouns like *himself* and pronouns like *him* compete in certain syntactic environments and that this competition favors the least ambiguous form. In a discourse context where Lockhart admires Lockhart, the alternative sentence with the reflexive *himself* unambiguously renders this reading. Dowty (1980)'s intuition was the main inspiration for the BE CLEAR! constraint proposed in *Chapter 2*. The pragmatic reasoning behind Dowty (1980) and BE CLEAR! can be formally schematized as below.

(98) *Pragmatic Reasoning*

Sentence 1 (S1): *Lockhart admires himself*.

Sentence 2 (S2): *Lockhart admires him*.

i. S1 is only compatible with the reading that *Lockhart admires Lockhart*.

ii. S2 is compatible with any reading where Lockhart admires some relevant male in the discourse: *Albus, Snape, Ron, ..., Lockhart*

iii. The meaning conveyed by S2 is a superset of that conveyed by S1.

iv. The speaker is cooperative, and following the **Maxim of Quantity**[2]. Therefore, the speaker is being maximally informative.

v. If the speaker used S2 instead of S1, which unambiguously means that *Lockhart admired Lockhart*, then the speaker either believes S1 to be false or they do not have sufficient evidence to assert it.

vi. **Implicature:** *Lockhart admires someone other than himself.*

One of the steps in (98) references the set-subset relationship between the two alternative sentences. While *Lockhart admires himself* can only mean that Lockhart admires Lockhart, *Lockhart admires him* can refer to any male referent in the discourse: Dumbledore, Snape, Voldemort, Ron, or whomever else. Crucially, *Lockhart admires him* has an object that can also logically refer to Lockhart, since Lockhart is also a male referent in the given context. Dowty (1980) argues that by virtue of this pragmatic reasoning speakers choose the unambiguous *himself* to express a reflexive event. Consequently, disjoint reference effects are obtained for pronouns which compete for the same syntactic position as a reflexive.

In Reinhart (1983a) and Grodzinsky & Reinhart (1993), Dowty (1980)'s *avoid am-*

[2]
(i) *The Maxim of Quantity (Grice 1975)*
   a. Make your contribution to the conversation as informative as required.
   b. Do not make your contribution more informative than is required.

biguity principle is translated into a general preference for unambiguously bound variables over unbound variables. As dscussed in *Chapter 2*, one of the core assumptions of Reinhart (1983a) is that binding relations are a syntactic phenomenon, whereas coreference is constrained by pragmatic considerations: bound variables are subject to syntactic-semantic constraints, while the interpretation of unbound pronouns is achieved via pragmatic reasoning.

(99) RULE I: INTRASENTENTIAL COREFERENCE

NP A cannot corefer with NP B if replacing A with C, a variable A-bound by B, yields an *indistinguishable interpretation*.

(Grodzinsky & Reinhart, 1993, ex. (20), p.79)

Rule I blocks coreference if a sentence with a bound variable can express the same meaning. Following Reinhart, Heim (1993, 1998) and later Roelofsen (2010) adapt *Rule I* into the *Coreference Rule* constraint, which serves the same purpose: to prefer LFs with bound variables, as opposed to unbound ones, if they have the same interpretation in a given context.

(100) COREFERENCE RULE

A speaker will never use a logical form LF in a context C if the LF is *semantically indistinguishable* from one of its binding alternatives.

(Roelofsen, 2010, p.119)

The two constraints in (99) and (100) were designed to account for disjoint reference effects for pronouns targeting a local *referential* antecedent, such as *Lockhart* or *the professor*. The assumption is that in the case of syntactic-semantic binding proper, *Condition B* rules out LFs like the one in (101): pronouns cannot be bound.

(101) *$\mathbf{Every\ boy}_1\ \lambda_1\ [t_1$ talked about $\mathbf{him}_1]$.

In the example above, after the subject, *every boy*, undergoes movement, it λ-binds its trace, as well as the pronoun *him* with which it is coindexed. The same reasoning

applies to (102a), where *him* has the same index as the λ-binder. Condition B deems (102a) ungrammatical, but not (102b), where no pronoun binding takes place.

(102) a. *$\textbf{Lockhart}_1$ λ_1 [t_1 talked about $\textbf{him}_1$].

b. $\textbf{Lockhart}_1$ λ_2 [t_2 talked about $\textbf{him}_1$].

In the LF in (102b), the trace of *Lockhart*, t_2, and him_1 do not share the same index. Therefore, *Lockhart* does not λ-bind *him*, although *Lockhart* and *him* are coindexed. It is precisely cases like these that *Rule I* and the *Coreference Rule* apply to. In a context where Lockhart talked about Lockhart, the two LFs in (102) arguably have *indistinguishable interpretations*. According to the definitions in (99) and (100), then, the unbound LF in (102b) is dispreferred by virtue of the existence of its binding alternative, (102a) (which is separately ruled out by Condition B).

As shown above, constraints like *Rule I* and the *Coreference Rule* stipulate a preference for bound variables over coreference: coreferent LFs always compete with their bound variable counterparts. This stipulation leads to a preference of expressing reflexive meaning by means of bound variables.[3] Given the assumption that Conditions A and B regulate the pronominal form of a bound variable, *Rule I* and the *Coreference Rule* do not distinguish between different bound variable LFs. In other words, these constraints predict that contextual ambiguity should not play a role in the selection of a pronominal form for a bound variable with respect to cases like (103) below, where both of the alternatives involve binding.

(103) a. $\textbf{Every boy}_1$ λ_1 [t_1 talked about $\textbf{him}_1$].

b. $\textbf{Every boy}_1$ λ_1 [t_1 talked about $\textbf{himself}_1$].

Given the assumption that only *coreference* is subject to pragmatic considerations, *Rule I* and the *Coreference Rule* predict that contextual ambiguity should only play a

[3]Syntactic-based competition accounts of the Binding Theory (Safir 2004, 2014; Rooryck & vanden Wyngaerd, 2011;) obtain a similar effect as a consequence of their assumptions about the syntactic-semantic make up of pronouns.

role in the selection of a pronominal form targeting a local *referential antecedent*. The question to ask at this point, then, is twofold: (1) is there any evidence that Gricean reasoning affects the production rate of pronouns in Condition B environments, and (2) is this effect only observed when the local subject is *referential*?

As the inspiration for many modern binding theories, it is theoretically important to ascertain whether ambiguity avoidance strategies apply to within-sentence pronouns. To effectively test this hypothesis, we need to look at languages where both the reflexive and the non-reflexive interpretations of personal pronouns like *him* and *her* are grammatical, which is why we turn to Romanian.

3.1.3 Romanian pronouns

As shown in *Chapter 2*, Romanian pronouns do not obey Condition B, providing the perfect testing ground for intrasentential ambiguity avoidance strategies.

For transitive sentences, the presence of the reflexive clitic *se* renders the sentence with the overt personal pronoun *el* unambiguously reflexive, as in (104).

(104) a. **Lockhart**$_1$ **se**$_{1/*2}$ admiră (pe **el**$_{1/*2}$).
Lockhart REFL.CL admires (ACC him)
Lockhart admires himself.

b. **Lockhart**$_1$ îl$_{2/*1}$ admiră (pe el$_{2/*1}$).
Lockhart MASC.SG.CL admires (ACC him)
Lockhart admires someone else.

Romanian has no oblique clitics, however, which means that when it comes to non-transitive predicates, personal pronouns are ambiguous between a reflexive and a disjoint reading. This is also the case for pronouns which serve as prepositional objects, as below.

(105) **Lockhart**$_1$ a vorbit despre **el**$_{1/2}$.

Lockhart has talked about him

Lockhart talked about himself / about someone else.

The sentence in (105) includes the same pronoun as in (104), but no clitic. As a result, this sentence is compatible with the two different readings illustrated above. The two pictures depict a conversation between two male characters: Snape and Lockhart. The blond character, Lockhart, is talking, and the speech bubble features the topic of conversation. As for the picture on the left, Lockhart is shown talking about Lockhart. The picture on the right displays a similar scenario, in this case, however, the speech bubble features Snape, which means that Lockhart is talking about Snape. The sentence in (105) is ambiguous between the two readings.

The ambiguity of personal pronouns in Romanian is especially surprising given the fact that this language does not lack reflexive anaphors. In fact, in the morphosyntactic competition-based theoretical literature (Safir, 2004; Rooryck & vanden Wyngaerd, 2011), as well as with respect to BE CLEAR!, the expectation is that regular pronouns should give rise to condition B effects in syntactic contexts where dedicated reflexives are available, as we saw in the previous chapter. The availability of a reflexive reading for a sentence like (105), then, where the pronoun *el* is used, is unexpected, since Romanian also has unambiguously reflexive expressions like the emphatic complex reflexive *el însuşi* 'himself', illustrated in (106b), as well as a genderless simplex reflexive pronoun, *sine* 'self' shown in (106c).

(106) a. **Lockhart** a vorbit despre **el**. PRONOUN

Lockhart has talked about him

Lockhart talked about him / himself.

b. **Lockhart** a vorbit despre **el** **însuşi**. EMPHATIC

Lockhart has talked about him himself

Lockhart talked about himself.

c. **Lockhart** a vorbit despre **sine**. REFLEXIVE

Lockhart has talked about self

Lockhart talked about himself.

Crucially, in Romanian, unlike in English, personal pronouns can be bound by clause-mate antecedents. As shown in (107b), where the subject is a quantified expression, *el* is yet again ambiguous between a bound variable and a disjoint reading, even though the alternatives in (107a) can unambiguously express the bound variable interpretation.

(107) a. **Fiecare candidat**$_1$ vorbise despre **sine**$_{1/*2}$ / **el** **însuşi**$_{1/*2}$.

every candidate talked about SELF / him in-SELF

'Every candidate talked about himself'.

b. **Fiecare candidat**$_1$ vorbise despre **el**$_{1/2}$.

every candidate talked about him

'Every candidate talked about him / himself'.

While *Rule I* and the *Coreference Rule* would not predict contextual ambiguity to play any role in the choice between (107b) or of (107a), since both LFs involve bound variable constructions, they predict an ambiguity effect to obtain in the case of sentences with referential subjects, like (106), which arguably involve coreference.

Our ultimate question is: what forms do Romanian speakers prefer to express local coreference, and bound variables, and is this preference influenced by the

pragmatic context? To clearly measure the effect of AMBIGUITY with respect to the production and interpretation of regular pronouns, the focus should be on a syntactic environment which allows for both reflexive and non-reflexive interpretations. To satisfy this requirement, we look at intransitive predicates with prepositional objects in Romanian, precisely due to their flexibility in interpretation.

3.1.4 The current study

The goal of the two production experiments is to determine whether within sentence binding dependencies are subject to the same pragmatic pressures as cross-sentential anaphoric reference. Given the assumption in the theoretical literature regarding the difference in the semantic mechanism between coreference and binding, we look at both scenarios to see whether the two differ with respect to the effect of pragmatic context. Crucially, binding, a direct logical relation between a variable and an antecedent, should not be affected by pragmatic considerations.

I hypothesize that the selection of a form for a locally bound variable reflects economy, processing *and* pragmatic considerations. One pragmatic constraint is ambiguity avoidance: speakers attempt to minimize ambiguity by selecting the pronominal form that best distinguishes the target antecedent in a given context (Reinhart, 1983a; Arnold, 2010). In *Chapter 2*, I proposed an *ambiguity avoidance* constraint, BE CLEAR!, the definition of which is repeated in (3.1.4). Like its predecessor, the *Coreference Rule*, BE CLEAR! is a pragmatic constraint which compares alternative sentences with indistinguishable interpretations. The key difference is that BE CLEAR!, a Gricean constraint more closely related to Dowty (1980)'s initi al intuition regarding ambiguity avoidance effects, compares pronominal forms, rather than LFs, and does not stipulate the preference of bound variable LFs over LFs expressing coreference.

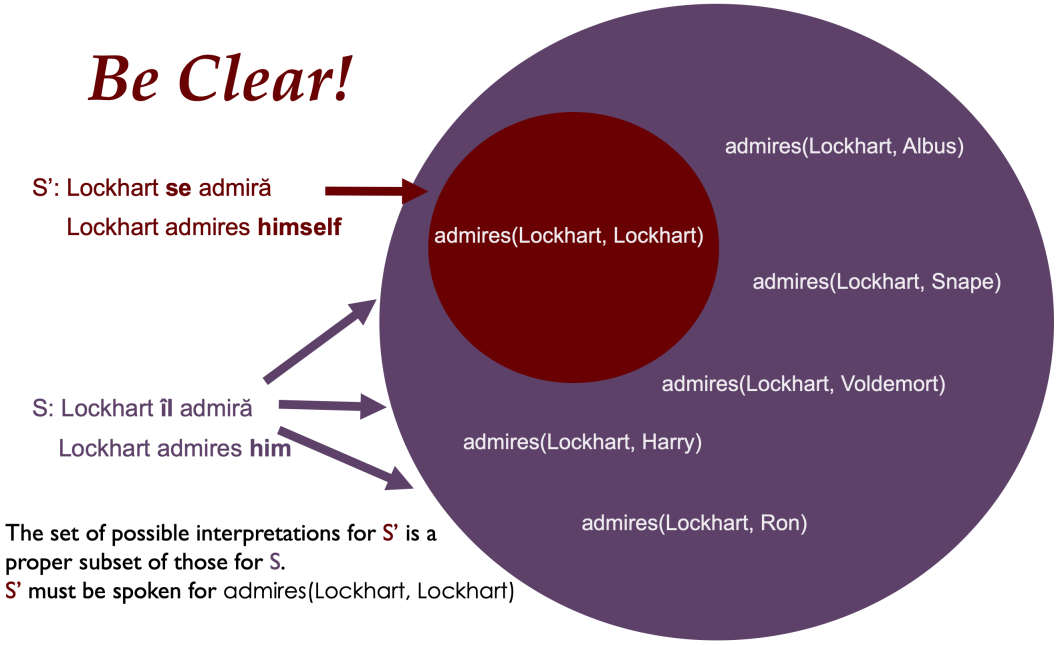
(108) **BE CLEAR!**

Given a context C, when choosing between two alternative sentences, S and S', both of which include a non-logophoric pronominal form in the same syntactic position, speak S' iff:

i. S and S' have *indistinguishable interpretations* in C, and

ii. the set of possible interpretations for S' is a **proper subset** of the set of possible interpretations for S.

(109) BE CLEAR! *Predictions*



As shown in *Chapter 2*, BE CLEAR! can straighforwardly account for the division of labor of reflexive and non-reflexive clitics in Romanian. The graph above fleshes out this competition. As outlined in *Chapter 2*, like its English counterpart, *Lockhart admires himself*, the Romanian sentence with the reflexive clitic in (104a) can only have a bound variable reading: *Lockhart λx [x admires x].* The assumption is that the Romanian sentence with the non-reflexive clitic in (104b) can refer to any relevant male referent in the context, and that it may express a bound variable relation, like (104a), as well as coreference (*Lockhart λx [x admires Lockhart]*)and disjoint reference

(*Lockhart λx [x admires y], where y is male.*) Therefore, the set of possible interpretations for S', the reflexive clitic sentence, is a proper subset of the set of interpretations for S. According to BE CLEAR!, in a context where the two sentences have indistinguishable interpretations (Lockhart admires Lockhart), S' must be spoken.

Previous constraints on intrasentential pronominal reference do not predict that contextual ambiguity should play a role in the selection of a pronominal form for a bound variable with respect to cases like (103) and (107) above. Unlike its predecessors, BE CLEAR! predicts there to be ambiguity avoidance effects for sentences with referential subjects, like in (106), as well as for sentences with quantified subjects like (107). The production experiments were designed to target this difference.

The two experiments differ in that the subject of the target sentence is either *referential* or *quantified*. The first experiment was designed to investigate cases where the subject is a referential DP. All referents are given in the context by means of proper names. The role of this experiment is to determine whether the rate of pronoun production is affected by context ambiguity in the case of coreference with the local subject. The second experiment only includes items where the subject is a quantified DP, like *every boy*. Here the question is whether the rate of pronoun production is affected by context ambiguity in the case of variables bound by the local subject. This manipulation will allow us to distinguish between the *Coreference Rule* and the more generic BE CLEAR!, since under the assumption of the former, context is *not* expected to impact the production rate of regular pronouns targeting *quantified subjects*.

BE CLEAR! predicts that participants should use fewer regular pronouns in ambiguous contexts both in the case of coreference and in the case of bound variables. In other words, we expect an ambiguity avoidance effect in both experiments. Furthermore, a generic ambiguity avoidance strategy also predicts that speakers will use fewer regular pronouns in ambiguous disjoint contexts as well. This secondary

prediction is in line with the evidence in the psycholinguistic literature regarding ambiguity avoidance effects at the level of pronouns which refer to cross-sentential antecedents. Given the parallel between pronouns targeting antecedents in a previous sentence and pronouns which are disjoint from the local subject, the expectation is that similar ambiguity avodiance effects should obtain for these pronouns in locally disjoint contexts in Romanian.

3.1.5 Design Considerations: Pronoun Resolution Factors

As mentioned in the previous chapters, a main goal of this dissertation is to investigate both the production and comprehension of Romanian pronouns in the same syntactic environment, by using virtually identical stimuli across these studies. Given this desideratum, the experimental stimuli were carefully constructed so as to allow for both locally bound and disjoint interpretations and to avoid biasing the potential speaker or hearer towards one particular interpretation or one particular pronominal form. Therefore, the following considerations and observations from the psycholinguistic literature were also taken into account.

A hypothesis that has received much support in the literature is that a referent's *prominence* or *salience*, which directly impacts pronoun production and resolution, is determined by an interplay of factors (Ariel, 1990; Gordon et al., 1993; Arnold, 1998, 2001; Kaiser & Trueswell, 2008; Arnold, 2010; Fukumura & van Gompel, 2015, a.m.o). These factors include (but are not limited to) *syntactic gender* (McDonald & MacWhinney, 1995; Garnham et al., 1995; Badecker & Straub, 2002; Nieuwland, 2014), *order of mention* (Gernsbacher & Hargreaves, 1988; Gernsbacher et al., 1989), *topicality* (Gordon et al., 1993; Grosz et al., 1995; Gundel, 1999), *syntactic role* (Gordon et al., 1993; Kaiser & Trueswell, 2008; Fukumura & van Gompel, 2015).

According to some accounts, the first mentioned referent in a sentence is the most prominent (Gernsbacher & Hargreaves, 1988; Gernsbacher et al., 1989). This

effect can be confounded with subjecthood, given that in English, subjects are often sentence-initial. However, Gernsbacher & Hargreaves (1988), and later Carreiras et al. (1995) in a study on Spanish, argue that the advantage of being the first mentioned referent holds irrespective of syntactic position, providing evidence that the effect of *first-mention* is still observable for *Tina* in the sentence below, even though *Tina* is not the sentence subject.

(110) Because of Tina, Lisa was evicted from the apartment. She....

The effect of *first-mention* found by Gernsbacher & Hargreaves (1988) in sentences like (110) can also be argued to be confounded with that of *topicality*. Like sentence subjects, preposed PPs such as *because of Tina* in (110) have been assumed to topicalize discourse referents (Chafe, 1976; Prince, 1981; Ward & Birner, 2004). There is evidence that comprehenders prefer to resolve pronouns to *Topic* antecedents, with topics being assumed to be *prominent* in the discourse, due to conveying given information (Ariel, 1990; Gordon et al., 1993; Grosz et al., 1995; Gundel, 1999).

Prominence has also been argued to be of a syntactic nature. Crawley et al. (1990), Frederiksen (1981), and Gordon et al. (1993) found that participants preferred to resolve pronouns to antecedents that were in a *subject position*, but in most of these studies grammatical role was also confounded with order of mention: the subject was mentioned first. Given that Finnish has both SVO and OVS word order, Järvikivi et al. (2005) manipulate the *first-mentioned* antecedent in a visual world eye-tracking experiment on ambiguous cross-sentential subject pronouns in Finnish (*Tony Blair (subject) shook hands with George Bush (object). He ...* vs. *George Bush (object) shook hands with George Bush. He...*). The results of Järvikivi et al. (2005) illustrate that both *first-mention* and *subjecthood* are significant factors for pronoun resolution. However, in a similar experiment on pronoun comprehension, Kaiser & Trueswell (2008) find an effect of grammatical role, but no effect of *first-mention*, rendering the *first mention advantage* unreliable. Fukumura & van Gompel (2015)

provide further evidence that both the production and comprehension of regular pronouns are primarily affected by the antecedent's syntactic role, rather than by antecedent position[4] Like Gernsbacher & Hargreaves (1988), Fukumura & van Gompel (2015) manipulate the order of the subject and an adjunct prepositional phrase in order to compare the *subjecthood* and *first-mention* effects in English (*Barry/Sally was in debt like Sally/Barry. He...* vs. *Like Barry/Sally, Sally/Barry was in debt. He...*). The results of their eye-tracking experiment indicate that pronouns whose antecedent was a grammatical subject (rather than a prepositional object) were easier to process, irrespective of word order.

In sum, there is experimental evidence showing that *subjecthood*, *topicality*, and *order of mention* may all affect pronoun resolution preferences and processing. Given these observations, the experimental items in the Romanian comprehension studies discussed in this chapter include a preposed topic prepositional phrase immediately followed by the sentence subject, as in (111).

(111) *Acasă la Mihai*, *Andrei a vorbit despre el*.

home at Mihai Andrei has talked about him
At Mihai's house, Andrei talked about him(self).'

Following the assumptions outlined above, the two referents in (111) can both be argued to be prominent. Both *Mihai* and *Andrei* are introduced in topic positions: *Mihai* is the object of a preposed topic prepositional phrase, and *Andrei* is the preverbal sentence subject, which is assumed to be a syntactic topic position in Romanian (Cornilescu, 2000). Should *subjecthood* indeed be more impactful than *order of mention*, as found in Kaiser & Trueswell (2008) and Fukumura & van Gompel (2015), a prediction would be that comprehenders will resolve the pronoun to the subject referent more often than to the referent introduced by the prepositional

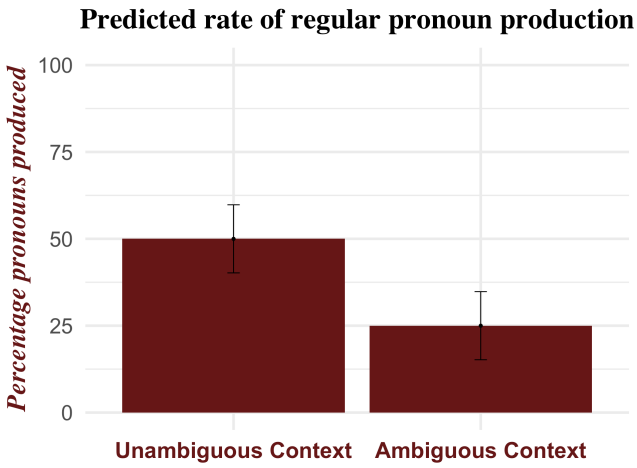
[4]In the same study, Fukumura & van Gompel (2015) observe that repeated names are more strongly affected by the linear position of the antecedent, rather than its syntactic role.

phrase. Should *order of mention* also be a significant factor, however, this would balance the scale of prominence between the two referents in (111).

3.2 Experiment 1: Referential Subjects

The main question this first experiment asks is whether the production rate of regular pronouns is affected by contextual ambiguity in the case of *coreference* with the local subject. As previously mentioned, a secondary question is whether the same effect is obtained in contexts which express disjoint reference with the local subject. This is important for two reasons: given the evidence from the psycholinguistic literature in favor of ambiguity avoidance in pronouns in crosssentential contexts, we expect all pronouns which are disjoint in reference from a local antecedent to be subject to a similar constraint. Secondly, the size of the ambiguity avoidance effect in the disjoint reference case serves as a control for the coreference conditions.

(112) BE CLEAR! *Prediction for regular pronouns*



The hypothesis is that BE CLEAR! is a pragmatic constraint which holds of both local coreference and disjoint reference environments. Under this hypothesis, the following predictions are made. Firstly, participants are expected to use overall fewer regular pronouns like *el* 'him' and *ea* 'her' in ambiguous contexts. Since BE CLEAR!

is an ambiguity avoidance constraint, we might expect that the effect observed for the production rate of pronouns referring to a cross-sentential antecedent will replicate in the case of pronouns referencing a clausemate antecedent. Another prediction BE CLEAR! makes is that *more reflexive pronouns* will be used in ambiguous reflexive contexts than in unambiguous ones, since reflexives would unambiguously identify the referent. Similarly, a version of BE CLEAR! that would extend to the competition between pronouns and names, would also predict that participants would use *more names* in ambiguous disjoint contexts than in unambiguous disjoint contexts.

3.2.1 Design

The experiment is based on a picture description task with a 2 x 2 factorial design (PICTURE TYPE X AMBIGUITY). Participants were presented with a picture and were asked to continue a sentence based on the events depicted within the picture. The PICTURE TYPE factor teases apart two scenarios: local coreference and disjoint reference with the sentence subject. The AMBIGUITY factor, following Arnold & Griffin (2007), is a simple gender manipulation with respect to whether the characters have the same gender (*Match*) or different genders (*Mismatch*).

3.2.2 Participants

Sixty-eight participants (62 female) were recruited from the University of Bucharest undergraduate community in exchange for monetary compensation (30 RON - roughly $8 USD). All participants were native speakers of Romanian and gave informed written consent for the use of their data. The age range was between 18 and 30, with an average age of 20.4. Three participants were excluded from the analysis due to a low rate of target responses ($< 50\%$). The remaining 65 participants had an average rate of 91.8% target responses, which individually ranged

between a minimum of 50% and a maximum of 100%.

3.2.3 Materials

16 experimental items were constructed. Each item involved a target sentence and a target picture. Each target picture and sentence set was preceded by a short context to introduce the relevant discourse referents, alongside their portraits, in a random order. Then, the target picture and completion prompt were both presented on the screen. An example of an entire trial, including the context screen, is given in (113) below.

(113) a. **Context Screen**:

Acesta este Andrei.

this is Andrei

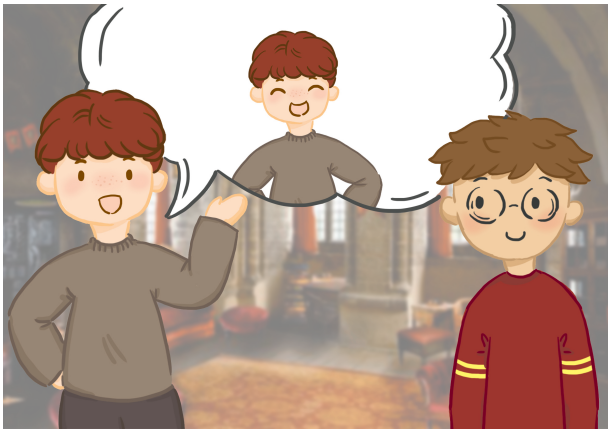
'This is Andrei.'

Acesta este Mihai.

this is Mihai

'This is Mihai.'

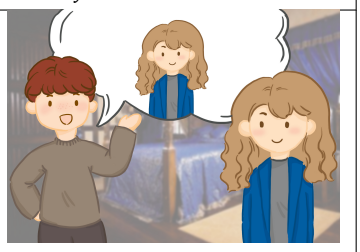
b. **Target Screen**:



Acasă la Mihai, Andrei a vorbit despre ...
home at Mihai, Andrei has talked about ...
'At Mihai's house, Andrei talked about ... '

Each target sentence consists of a topic prepositional phrase (PP) which names one of the referents (*at X's party, in X's garden*) introduced in the short context, an overt subject which refers to the other antecedent by name, and a predicate which takes a PP object (*laugh at, cook for*) and is equally plausible with a reflexive and non-reflexive continuation. I confirmed that both reflexive and disjoint interpretations were plausible for the 16 items by checking with 4 naive native speakers prior to running the experiment. Eight of the predicates used in the 16 items were communication verbs (*talk, chatter, narrate*, etc.) The rest can be translated as follows: *lie about, cook for, write about, joke about, dream about, think about, read about, laugh at*. No transitive verbs were used to avoid clitic doubling.

The experiment included a total of eight characters: 4 male and 4 female. For each of the 16 experimental items 4 conditions were constructed, arranged in a 2 x 2 design crossing PICTURE TYPE (*Local Coreferent / Local Disjoint*) with AMBIGUITY (*Gender Match/Mismatch*). The PICTURE TYPE factor indicated whether the target picture included a speech (or thought) bubble depicting an event in which the speaker was thinking or speaking about themselves (LOCAL COREFERENT) or about the other discourse referent introduced in the topic prepositional phrase (LOCAL DISJOINT). The AMBIGUITY factor refers to whether the topic PP referent had the same gender (MATCH) or differed in gender (MISMATCH) with the speaker. For each item, the speaker remained the same across the 4 conditions. An example of a single item, in all four experimental conditions, is illustrated in *Table 3.1*, The gender of the speaker was counterbalanced across the items: 8 items with male speakers, 8 items with female speakers. The referent pairs were also balanced: each of the eight characters served as the speaker only for two items and

	COREFERENT MISMATCH	DISJOINT MISMATCH
		
MISMATCH SENTENCE	*Acasă la Irina, **Andrei** a vorbit despre …* home at Irina, Andrei has talked about … 'At Irina's house, Andrei talked about …'	

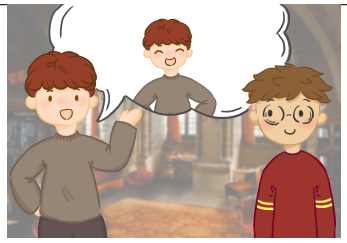
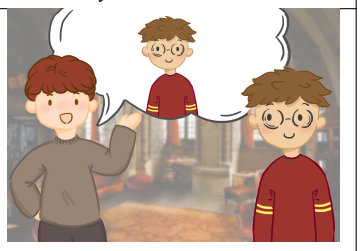
	COREFERENT MATCH	DISJOINT MATCH
		
MATCH SENTENCE	*Acasă la **Mihai**, **Andrei** a vorbit despre …* home at Mihai, Andrei has talked about … 'At Mihai's house, Andrei talked about … ´	

Table 3.1: Sample Item Pictures & Target Sentences by Condition for Experiment 1. Female character names are underlined, male character names are in bold.

their partners were different in each item.

As shown in *Table 3.1*, each condition had a different target picture, and each picture was paired with a target sentence lead-in. The PICTURE TYPE factor did not affect the context and target sentence lead-in. However, the target sentence lead-in did vary across the levels of the AMBIGUITY factor: the MATCH and MISMATCH conditions differed from each other with respect to the context and the target sentence. *Table 3.1* illustrates this contrast for the item in (113). The pre-critical context screen introduced the two referents in each sentence in a random order.

The items were distributed in four Latin Squared Lists and interspersed with 20 fillers, which were all grammatical and similar to the test items in terms of struc-

tural complexity. The filler items only introduced a single character in the context preceding the picture-sentence set. 10 of the fillers referenced objects or abstract concepts in the speech/thought bubble disallowing a reflexive interpretation. 8 of the fillers used an adjective phrase predicate (*proud of, disappointed in*, etc.) which could be construed as reflexive, though not necessarily (*proud of his achievement, proud of himself*). Thus, each participant would be exposed to at most 16 reflexive scenarios (out of a total of 36 sentences). 18 out of 20 fillers were subject-initial and did not include a topic PP. I also constructed 3 more items modeled after (but different from) our experimental items: 2 practice items and an item used in the Instructions. The item used in the Instructions simulated a Local Coreferent Mismatch condition; the two practice items were modeled after a Local Disjoint Mismatch condition and a single antecedent filler item, respectively. The Instructions and practice items were not repeats of any of the 16 critical items or fillers. The full list of items, fillers and practice items is given in the *Appendix Chapter*.

3.2.4 Procedure

The experiment took place at the Faculty of Foreign Languages and Literatures (*Facultatea de Limbi şi Literaturi Străine* - FLLS) of the University of Bucharest[5]. Participants were recruited through flyers, class announcements and on the online platform of FLLS. Consequently, most of the participants were FLLS students: about 9 in 10 FLLS students are female and this led to most of our participants being female, as well.

The experiment was coded in *PsychoPy* on a 2013 *Macbook Air* and run on the same laptop. After giving informed consent, participants' responses were recorded using the *Macbook*'s audio recorder, as well as a *Tascam DR-60DmkII* recorder with a *Shure* omnidirectional lavalier microphone. Participants were walked through the

[5]I thank Octavian Roske and the American Studies division of the English department of FLLS for allowing us to run the entire experiment in one of their offices.

instructions in PsychoPy and told that their task is to identify the topic of conversation or contemplation depicted in the speech or thought bubble of each picture. For each item, the context introducing the relevant discourse referents (alongside their portraits) was coded to remain on the screen for 9 seconds; the context screen was followed by a one second break (blank screen) after which the target picture and target sentence would be displayed at the same time. Participants were instructed to examine the target picture and silently read the target sentence before choosing a continuation, in order to avoid prosodic breaks between the completion prompt and the rest of the sentence. After having chosen a continuation and having uttered the entire sentence, participants would press the space bar to continue to the next item (with a 1 second break between items). Both the target picture and sentence would continue to be displayed on the screen until the participant pressed the space bar. After the instructions, the participants would go through two practice items, 36 items (experimental and filler), 2 exit poll items, and, finally, an exit interview with the experimenter. The entire process lasted, on average, around 45 minutes for each participant, 15-20 minutes of which were taken up by the experiment itself, depending on how fast any individual participant was.

3.2.5 Analysis

Participant responses were transcribed and annotated. Responses were coded as 'on target' when they correctly identified the referent in the target picture; target responses were pronouns (regular, reflexive, emphatic, etc.), names, and any noun or DP that referred to the character in the speech/thought bubble. I coded embedded sentence completions such as *'how he feels'*, nouns that did not identify the character in the bubble (like '*feelings*'), pronominal constructions which referred to the wrong antecedent, and possessive constructions as 'non-target.' Non-target responses were excluded from the analysis. 15 responses were lost due to a *PsychoPy*

error. In total, 11.27% responses out of the collected data were excluded from the statistical analysis. Consequently, of the 1073 total responses, data analysis was performed on 952 target responses.

Given that regular pronouns are ambiguous between coreferent and disjoint readings, the rate of regular pronoun production can be used to measure the effect of AMBIGUITY for both picture types. In all of the analyses run for the data in this experiment, both participants and items were taken as random factors.

For the on-target responses, I used logistic mixed effects regression to model the effect of AMBIGUITY (Match/Mismatch), the effect of PICTURE TYPE, as well as the interaction, with the use of pronouns as the dependent variable, AMBIGUITY and PICTURE TYPE as fixed effects, and Item and participants as random effects. I also fitted a second nested model to estimate the size of the AMBIGUITY effect within each picture type, with the use of pronouns as the dependent variable, PICTURE TYPE/MISMATCH as the fixed effect. In order to analyze the effect of BE CLEAR! on the production of proper names and reflexive pronouns, logistic mixed effects regression was also fitted to model the effect of AMBIGUITY within each PICTURE TYPE on the use of names and reflexives. In this case, the analysis was conducted only on the responses in the *Local Disjoint* conditions for proper names, and only the *Local Coreferent* conditions, respectively, for the reflexives. The dependent variable was the rate of proper names / reflexive expressions, with AMBIGUITY as the sole the fixed effect, and item and participants as random factors.

I ran a post-hoc, exploratory model to test for differences between conditions in the rate of on-target responses. In this model, the dependent variable was whether the response was 'on target', with PICTURE TYPE and AMBIGUITY as fixed effects, and Item and participants as random factors. Finally, given that most of the participants were female, *gender* was also added as a factor in a generalized linear model analysis. The gender of the participants was not significant. I also checked for or-

Response Type	Pronoun	Reflexive			Other	
	him	*himself*	*self*	*own person*	Name	Demonstrative
Coreferent Mismatch	54.5%	33.9%	5%	2.5%	4.1%	0%
Coreferent Match	39.1%	48.9 %	6.7%	1.3%	3.5%	0.5%
Disjoint Mismatch	49.6%	0%	0%	0%	45.9%	4.5%
Disjoint Match	23%	0%	0%	0%	73.2%	3.8%

Table 3.2: Rate of Production by participant Response Type in Experiment 1. Translations of Participants' Responses as follows. Pronoun: 'him' / 'her' - *el / ea*; Reflexive: 'himself' / 'herself' - *el însuşi / ea însăşi*, 'self' - *sine*, 'own person' - *propria persoană*; Demonstrative: 'this one' - *acesta / aceasta*.

der effects for the items by including the item order as a factor in the analysis. Item order was not a significant factor either.

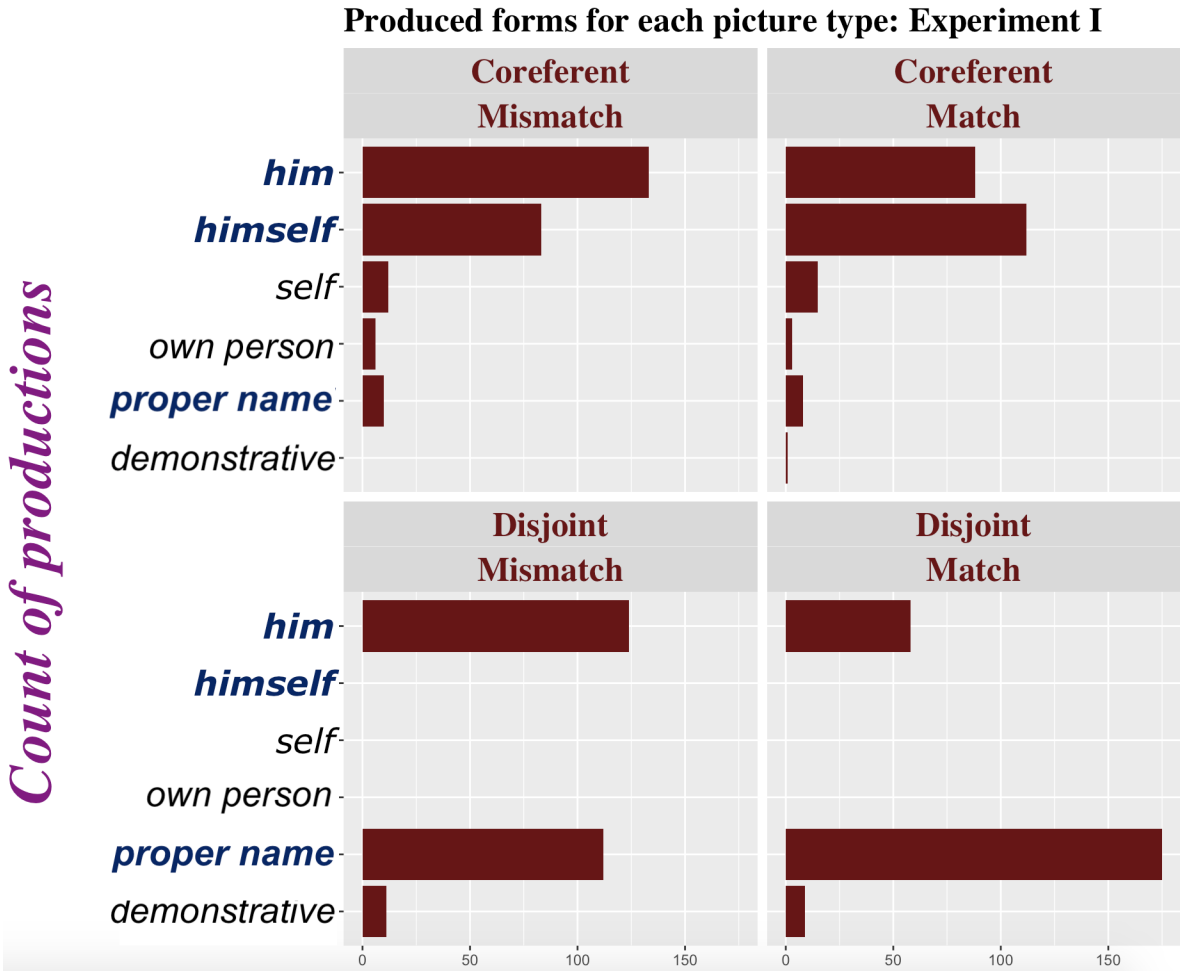
3.2.6 Results

The rate of production for each response type within the four conditions is given in Table 3.2. The highlighted column represents the rate of *regular pronoun* production. A graphical representation of the production counts of each response type is given in Figure 3.1. Significantly fewer pronouns were used in the *Match* conditions for both *Local Coreferent* and *Local Disjoint* contexts. To visualize this effect more clearly, Figure 3.2 illustrates the rate of regular pronoun production across the four conditions. *Table 3.3* lists the results of the main analysis.

Logistic mixed effects regressions revealed a main effect of Ambiguity (β = 1.24, z = 5.05, SE = 0.24, $p < 0.001$), a main effect of Picture Type (β = -0.82, z = -2.9, SE = 0.29, $p < 0.01$) and an effect of the interaction between the two factors (β = 0.85, z = 2.37, SE = 0.36, $p < 0.05$). The nested model reveals a reliable effect of Ambiguity for both *Local Disjoint* (z = 5.35, SE = 0.31, $p < 0.001$) and *Local Coreferent* (z = 2.75, SE = 0.29, $p < 0.01$) conditions; the impact is more modest for *Local Coreferent* than for *Local Disjoint* scenarios.

Secondly, the logisitc mixed effects regression model used to determine the effect of Ambiguity on the rate of *reflexive pronouns* and *proper names* also revealed

Figure 3.1: Response Type Count in Experiment 1.

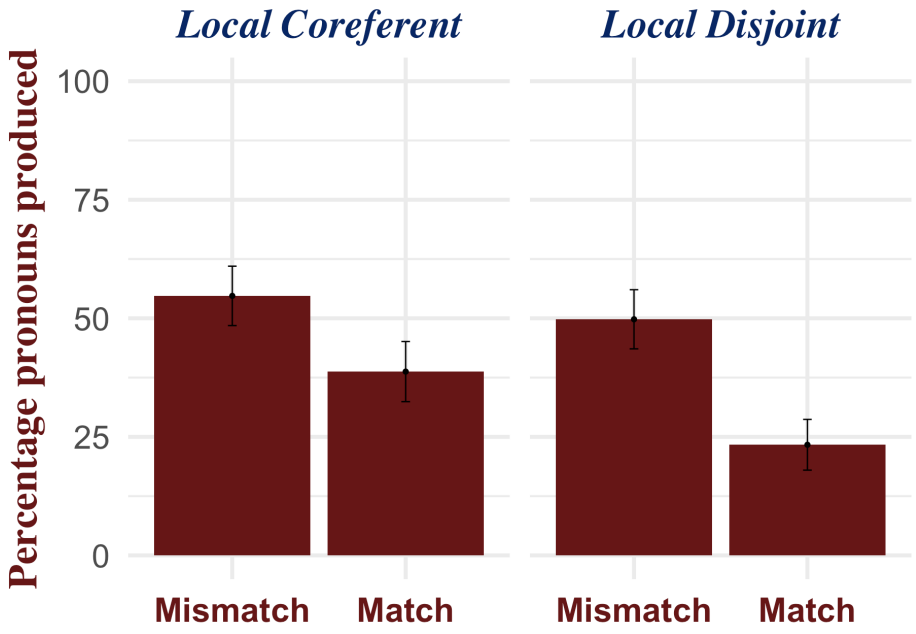


	Logistic Mixed Effects Model		
Factor	*Estimate*	*SE*	*z value*
AMBIGUITY	**1.24**	**0.24**	**5.05*** **
PICTURE TYPE	**-0.82**	**0.29**	**-2.81****
AMBIGUITY X PICTURE TYPE	**0.85**	**0.36**	**2.37***

	Nested Model: Effect of Ambiguity		
Picture Type	*Estimate*	*SE*	*z value*
LOCAL COREFERENT	**0.81**	**0.29**	**2.75****
LOCAL DISJOINT	**1.67**	**0.31**	**5.35*** **

Table 3.3: Logistic Mixed Effects Model Estimates in Experiment 1.
All significant effects are bolded. Legend: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Figure 3.2: Rate of regular pronoun production in Experiment 1.



	Effect of Ambiguity		
Response Type	*Estimate*	*SE*	*z value*
REFLEXIVE EXPRESSIONS	**-0.96**	**0.28**	**-3.44*** **
PROPER NAMES	**-1.75**	**0.31**	**-5.6*** **

Table 3.4: Logistic Mixed Effects Model Estimates in Experiment 1 for the production of reflexive pronouns (Local Coreferent) and proper names (Local Disjoint). All significant effects are bolded. Legend: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

	ON-TARGET RATE	TARGET RESPONSES
COREFERENT MISMATCH	91.7%	244
COREFERENT MATCH	84.7%	227
DISJOINT MISMATCH	92.2%	248
DISJOINT MATCH	89.6%	242

Table 3.5: On-Target Response Rate by Condition in Experiment 1.

reliable effects, the details of which are listed in *Table 3.4*. There was a significant effect of AMBIGUITY for both the rate of reflexive expressions in the *Local Coreferent* conditions (z = *-3.44, SE = 0.28, p <0.001*) and the rate of proper names in the *Local Disjoint* conditions z = *-5.6, SE = 0.31, p <0.001*) .

With respect to the on-target responses, the *Local Coreferent Match* condition had the lowest rate (84.7%), while the other three conditions ranged between 89.6% and 92.2%. The on-target response rate and the counts of target responses for each condition is given in *Table 3.5*. The post-hoc exploratory model that was run to test for differences between conditions for the rate of target responses reveals that there is an effect of AMBIGUITY (β = *0.8618, SE = 0.3556, z = 2.424, p < 0.05*), but no effect of PICTURE TYPE and no interaction.

3.2.7 Discussion

The first experiment revealed three primary results of interest. Firstly, there was an overall main effect of AMBIGUITY ($p < 0.001$): participants used fewer regular pronouns in ambiguous contexts (*Match*) than in unambiguous contexts (*Mismatch*) conditions. This is in line with the predictions of the hypothesis that a generic ambiguity avoidance constraint regulates the production of pronouns in contexts targeting an intrasentential antecedent. The nested model revealed that there was a significant difference in pronoun use for both the *Local Coreferent* conditions (15.4%), as well as the *Local Disjoint* conditions (26.3%).

Secondly, as expected,AMBIGUITY also plays a role in the production of proper

names and of unambiguously reflexive pronouns. The rate of proper name production sees a significant ($p < 0.001$) increase of 27.3% from the *Disjoint Mismatch* to the *Disjoint Match* conditions. Similarly, the experimental results also a significant ($p < 0.001$) increase of 16.7% in the production of reflexive expressions from the *Local Coreferent Mismatch* to the *Local Coreferent Match* conditions. A significant ($p < 0.01$) increase of 15% is also observed in the rate of production for the emphatic reflexive *el însuşi*.

Thirdly, the main effect of PICTURE TYPE observed indicates that participants generally used more regular pronouns in the *Local Coreferent* than in the *Local Disjoint* conditions. Although the difference in the production rate of *el/ea* between the *Coreferent Mismatch* and the *Disjoint Mismatch* conditions is marginal (5.1%), participants produced significantly more regular pronouns in *Coreferent Match* than in the *Disjoint Match* condition. The significant interaction between the two factors, PICTURE TYPE and AMBIGUITY, suggests that the ambiguity avoidance effect was stronger in the *Local Disjoint* scenarios. One possible motivation behind this discrepancy might be that regular pronouns are the preferred means of expressing local coreference and bound variables. Hence, despite the fact that ambiguity avoidance constrains the production of pronouns in both locally coreferent and locally disjoint contexts, due to the special status of regular pronouns as exponents of bound variable relations, the effect of AMBIGUITY is smaller in the *Coreferent Match* condition than in *Disjoint Match*.

Interestingly, the experimental results show that the pronoun *el/ea* is the preferred means (>50% of the on-target response types, on average) of expressing coreference as well as disjoint reference in unambiguous contexts, with names and emphatic reflexives taking the lead in ambiguous scenarios. This preference for personal pronouns in syntactic positions which would normally be subject to *Condition B* and *Rule I* is reminiscent of morpho-syntactic competition based accounts

of the *Binding Theory* (Safir, 2004, 2014; Rooryck & vanden Wyngaerd, 2011), which predict *smaller* pronominal forms to be favored as bound variable expressions. I return to this line of reasoning in *Section 3.5*.

Finally, the post-hoc exploratory model on the rate of on-target responses revealed a significant effect of AMBIGUITY ($p < 0.05$): participants produced more on-target responses in the MISMATCH conditions. This also suggests that ambiguous contexts were perhaps more difficult for participants, and the increased rate of non-target responses indicates yet another strategy of dealing with ambiguity.

Crucially, the effect of BE CLEAR! for pronouns which are coreferent or disjoint from an intrasentential referential subject was qualitatively the same as the ambiguity avoidance effect found in the psycholinguistic literature for pronouns targeting a cross-sentential antecedent. The effect of contextual ambiguity on the production rates of pronouns expressing coreference with a local referential antecedent is expected under the BE CLEAR! constraint, as well as Reinhart (1983a)'s *Rule I* and Roelofsen (2010)'s *Coreference Rule*. However, a surprising finding to the latter accounts would be if a similar effect obtains for locally bound variables. The experiment in the following subsection distinguishes these approaches.

3.3 Experiment 2: Quantified Subjects

According to Reinhart (1983a, 2006); Grodzinsky & Reinhart (1993); Roelofsen (2010, a.o.), context may play a role in the selection of a form of a pronoun which is coreferent with a local referential subject. However, in the case of variables bound by a local quantified subject, *Semantic Condition B* is assumed to affect their surface form, and not pragmatic considerations. Crucially, the semantic interpretation of the syntactic relationship between a bound variable and its antecedent remains the same, irrespective of the inventory of discourse referents in a given context.

With respect to BE CLEAR!, however, irrespective of whether the antecedent

binds the pronoun or whether the two DPs are merely coreferent, the choice of pronominal form is affected by potential contextual ambiguity. The main question the second experiment asks, then, is whether contextual ambiguity affects the rate of regular pronouns in the case of variables bound by a local subject. To ensure that participants are interpreting these variables as locally bound, the sentence subjects are always *quantified* expressions. In order to be able to compare the results of *Experiment 1* and *2*, the latter also asks if a similar ambiguity avoidance effect is obtained for pronouns which are disjoint in reference from a local quantified subject.

The main hypothesis is that BE CLEAR! is a pragmatic constraint which is taken into account in the computation of all types of reference relations: bound variables, coreference and disjoint reference. The predictions parallel those in *Experiment 1*. If speakers' choices are modulated by BE CLEAR!, they will attempt to choose less ambiguous forms when the context is open to interpretation. Consequently, the expectation is that the production rate of regular pronouns *el* and *ea* will be lower in ambiguous conditions, for both disjoint reference and locally bound scenarios. Once again, under the assumption of a generic ambiguity avoidance constraint, a higher rate of names and reflexive expressions is expected in ambiguous disjoint and ambiguous bound contexts, respectively.

3.3.1 Design

The experiment consisted of a picture description production task, along the lines of *Experiment 1*, the main difference being that all sentence subjects in *Experiment 2* are *quantificational*. In order to ensure that the results of the two experiments did not differ solely because we sampled from different populations, some participants were included in both *Experiment 1* and *Experiment 2*. Less than one third of the total number of participants in *Experiment 2* participated in both experiments. The experiments were conducted 4-5 months apart, so it is unlikely that the per-

formance of these participants was affected by having been exposed to the items in *Experiment 1*.

3.3.2 Participants

Sixty-eight participants (60 female) were recruited from the University of Bucharest undergraduate community in exchange for compensation (30 RON - roughly $8 USD). All participants were native speakers of Romanian and gave informed written consent for the use of their data. For the sake of comparison, twenty of them were recruited from the population which took part in *Experiment 1*. The age range was between 18 and 33, with a mean of 21.28. No participants were excluded from the analysis. The average rate of target responses was 98.2%. This ranged between a minimum of 81.2% and a maximum of 100%.

3.3.3 Materials

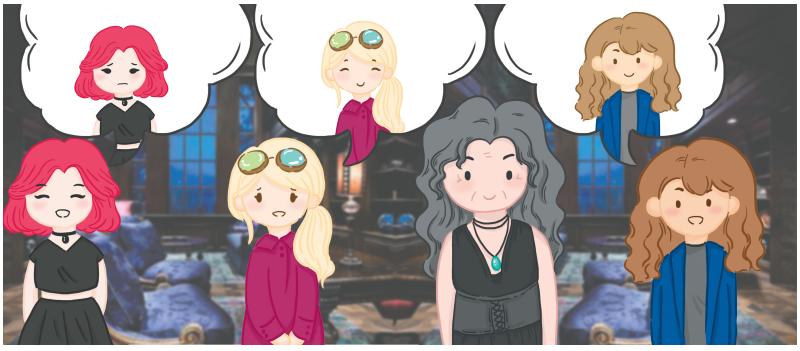
16 experimental items were constructed. Each item involved a target picture which depicted an event that participants would describe by continuing a target sentence fragment. Each target picture and sentence set was preceded by a two-sentence context to introduce the relevant discourse referents. The first sentence in the context always gives the name of one discourse referent and sets the location for the event; the second sentence presents the other three referents and their connection to the context. A sample item set is given in (114). The sentence subjects (and agents of the event) are always a set of three discourse referents which match in gender and age (3 boys *or* 3 girls), all of which were named in the preceding context. The fourth referent is an older relative. The subject is a quantified DP which targets the three young agents of the event (*every boy/girl*). The topic PP always referred to the older relative by name (*at Aunt Diana's house*, *in Grandpa Paul's library*). With the exception of the referents, most of the item sentences were exactly the same as in

Experiment 1. For constraints related to consistent picture size and exposition, the predicates in the *read about*, *write about* and *dream about* items were replaced with 3 other communication predicates. Thus, *Experiment 2* used *talk, chatter* type verbs in 11 out of the 16 items. The topic PPs for the 3 replaced items were also changed to match the sentence context.

(114) a. **Context Screen**:

Bunica Laura a fost vizitată recent de către familie. Monica,
grandma Laura has been visited recently by family Monica
Elena şi Irina au fost şi ele prezente.
Elena, and Irina have been and them present
'Grandma Laura was recently visited by his family. Monica, Elena and Irina were present too.'

b. **Target Screen**:



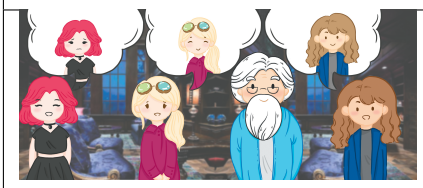
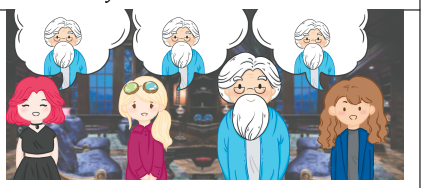
Acasă la bunica Laura, fiecare fată a vorbit despre ...
home at grandma Laura, every girl has talked about ...
'At Grandma Laura's house, every girl talked about ... '

The experiment revolved around eight older characters (2 grandmas, 2 grandpas, 2 aunts, 2 uncles) and six younger characters (3 boys and 3 girls). All of these characters and their accompanying portraits were introduced individually in the Instructions. For each of the 16 items, four conditions were created by virtue

of the same 2 x 2 design as in *Experiment 1*: PICTURE TYPE (*Local Bound / Local Disjoint*) was crossed with AMBIGUITY (*Gender Match/Mismatch*). The target pictures for each condition are illustrated in *Table 3.6*. Each picture includes a speech (or thought) bubble depicting an event which is either about the three speakers (LOCAL BOUND) or about the discourse referent mentioned in the topic PP (LOCAL DISJOINT). The speakers are invariant across the 4 conditions. The topic PP referent either has the same gender (MATCH) or differs in gender (MISMATCH) with the three speakers. In eight of the sixteen items the speakers were all female (*Monica, Elena, Irina*), while in the other eight they were all male (*Mihai, Daniel, Andrei*). The relational noun *nepot / nepoată* stands both for *nephew / niece* and *grandchild* in Romanian. Consequently, the subjects were referred to by *every boy*, *every girl*, *every nephew* and *every niece*, each construction being used in four different items.

As shown in *Table 3.6*, each condition is associated with a different target picture. The PICTURE TYPE factor (*Bound / Disjoint*) did not affect the context and target sentence, as illustrated in *Table 3.6* for the item in (114). Male character names are underlined, female character names are in bold. Across the four conditions, the target contexts differed solely in the name (and gender) of the older relative. As for the picture, the order of the three younger characters (and subjects of the event) matched the order in which they were introduced in the context sentence. In eight of the items, the older relative (and referent of the topic PP) was the second character depicted in the target picture from left to right. In the other half, as in (114), the older relative is the third character in the picture. This manipulation was done so that the "disjoint reference" character was not always in the same position in the target picture.

The items were distributed in four Latin Squared Lists and interspersed with 20 fillers. Due to the complexity of the items (universal quantifiers with four-character scenes), the fillers constructed were slightly more intricate than the ones in *Exper-*

	BOUND MISMATCH	DISJOINT MISMATCH
		
MISMATCH SENTENCE	*Acasă la <u>bunicul Paul</u>, **fiecare fată** a vorbit despre …* home at grandpa Paul, every girl has talked about … 'At Grandpa Paul's house, every girl talked about …'	

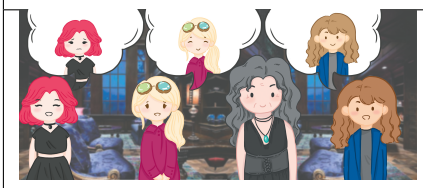
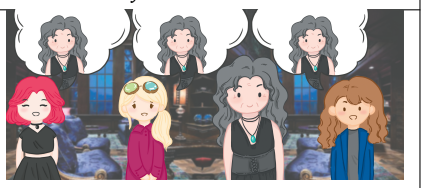
	BOUND MATCH	DISJOINT MATCH
		
MATCH SENTENCE	*Acasă la **bunica Laura**, **fiecare fată** a vorbit despre …* home at grandma Laura, every girl has talked about … 'At Grandma Laura's house, every girl talked about … ´	

Table 3.6: Sample Item Pictures & Target Sentences by Condition for Experiment 2. Male character names are underlined, female character names are in bold.

iment 1. The filler items included between 2 and 4 characters in each picture and preceding context. Thirteen of these depict three young characters which never match in gender (2 girls and one boy *or* 2 boys and one girl), unlike the experimental items where the young characters always match in gender. Six of the fillers could be construed as reflexive events, three necessarily as disjoint, and eleven necessarily referenced objects and abstract concepts. 10 filler items used a range of quantifiers like *some*, *two of the nephews*, etc. accompanied by pictures with 3 young characters. Five of the filler sentences started off with a topic PP which referenced one of the characters, similarly to the experimental items; for five of the fillers, the sentence initial topic PP did not refer to a character (e.g. *after the movie*); the other ten were subject initial. Of the latter, five fillers used sentence embedding (*One of the nephews told Uncle George that he's interested in...*). Two practice items were also constructed, and one more item which was used in the *Instructions*. The item constructed for the *Instructions* portion of the experiment simulated a Bound Mismatch condition; the two practice items were modeled after a Disjoint Mismatch condition and a two-character filler item, respectively. No *Instructions* or practice items were repeated in the experimental trials or in the fillers.

3.3.4 Procedure

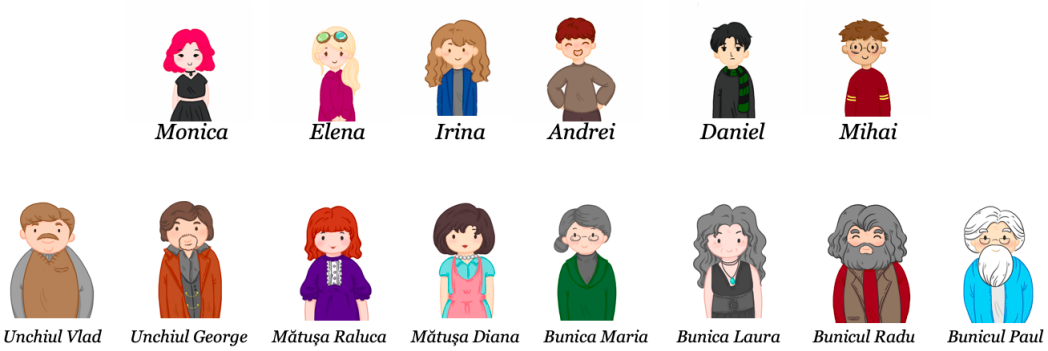
Once again, the experiment took place at the Faculty of Foreign Languages and Literatures (FLLS) of the University of Bucharest[6] and participants were recruited through flyers, class announcements, and via the FLLS Facebook group. For *Experiment 2*, we also e-mailed all of the *Experiment 1* participants to ask if they would be interested in participating in another experiment. The first 20 students to reply were recruited for the second experiment as well.

The experiment was coded in *PsychoPy* on a 2013 *Macbook Air* (lent from UMass

[6]We thank Alexandra Cornilescu, Larisa Avram, Anca Sevcenco, and the Linguistics division of the English department of FLLS for allowing us to run the entire experiment in one of their offices.

IT for the duration of the experiment) and ran on the same laptop. After having given informed consent, participants' responses were recorded using the *Macbook*'s audio recorder, as well as a *Tascam DR-60DmkII* recorder with a *Shure* omnidirectional lavalier microphone. Paricipants were walked through the instructions in PsychoPy and told that their task is to identify the topic of conversation or contemplation depicted in the speech or thought bubble of each picture. The experimental procedure was identical to *Experiment 1* with the following changes. Since *Experiment 2* involves four different discourse referents in each item, the portraits of the characters were not included on the context screen so as not to lead the participants into thinking the experiment tests their memory. Given the greater number of chracters than in *Experiment 1*, in this experiment the participants were introduced to all of the 14 characters (6 children, 8 older relatives) during the instructions: their names and respective portraits were presented on the same screen, as in *Figure 3.3*. For each item, the two-sentence context introducing the relevant discourse referents was coded to remain on the center screen for 7.5 seconds; the context would disappear, and the target picture would be displayed on the screen immediately afterwards. 2 seconds later, the target sentence would appear below the picture. Unlike in Experiment 1, there is no 1 second delay between the context and the target picture due to the fact that the context screen no longer includes images. Participants were instructed to examine the target picture and silently read the target sentence before choosing a continuation, in order to avoid prosodic breaks between the completion prompt and the rest of the sentence. After having chosen a continuation and having uttered the entire sentence, participants would press the space bar to continue to the next item (with a 0.5 second break between items; again, in *Experiment 1* the break was 1 second due to the fact that both the context and target screen included pictures). Both the target picture and sentence would continue to be displayed on the screen until the participant pressed the space bar.

Figure 3.3: Screen introducing all the Experiment 2 characters in the Instructions. Names (in order): Monica, Elena, Irina, Andrei, Daniel, Mihai, Uncle Vlad, Uncle George, Aunt Raluca, Aunt Diana, Grandma Maria, Grandma Laura, Grandpa Radu, Grandpa Paul.



After the instructions, the participants would go through two practice items, 36 items (experimental and filler), 4 exit poll items, and, finally, an exit interview with the experimenter. The entire process lasted, on average, around 45 minutes for each participant, 15-20 minutes of which were taken up by the experiment itself.

3.3.5 Analysis

I transcribed and annotated participant responses and used the same coding procedure as in *Experiment 1*. Responses were coded as 'on target' when they correctly identified the referent in the target picture; target responses were pronominal expressions, names, and any noun or DP that referred to the character in the speech/thought bubble. As in *Experiment 1*, non-target responses were excluded from the analysis. No participants were excluded from the analysis, as the lowest on-target rate by participant was 81.25%.[7] In total, only 1.83% of the collected data was excluded. Consequently, of the 1088 total responses, data analysis was performed on 1068 target responses.

To parallel *Experiment 1*, a planned logistic mixed effects regression model was

[7]The improved rate of target responses in comparison to *Experiment 1* is in part due to having tweaked the instructions to emphasize that the experiment was not a test of participants' creativity.

run to determine the effect of AMBIGUITY (Match/Mismatch), the effect of PICTURE TYPE (*Bound / Disjoint*), as well as the interaction,with the use of pronouns as the dependent variable, AMBIGUITY and PICTURE TYPE as fixed effects, and Item and participants as random effects. A second nested model was fitted to estimate the size of the AMBIGUITY effect within each PICTURE TYPE scenario, with the use of pronouns as the dependent variable, and PICTURE TYPE/MISMATCH as the fixed effect. Similarly to the analysis for *Experiment 1*, logistic mixed effects regression was also fitted to model the effect of AMBIGUITY within each PICTURE TYPE on the use of names and reflexives. In this case, the analysis was conducted only on the responses in the *Local Disjoint* conditions for proper names, and only the *Local Bound* conditions, respectively, for the reflexives. The dependent variable was the rate of proper names / reflexive expressions, with AMBIGUITY as the sole the fixed effect, and item and participants as random factors.

I again ran a post-hoc, exploratory model to test for differences between conditions in the rate of on-target responses. In this model, the dependent variable was whether the response was 'on target', with PICTURE TYPE and AMBIGUITY as fixed effects, and Item and participants as random factors. Finally, given that most of the participants were female, *gender* was also added as a factor in a generalized linear model analysis. The analysis revealed that participant gender was not a significant factor. Order effects were also checked for, and the order of the items did not prove to be a significant factor either.

3.3.6 Results

The rate of production for each response type within the four conditions is given in Table 3.7. The rate of *regular pronoun*, which can be used to measure the effect of AMBIGUITY across all conditions, is highlighted. A graphical representation of the production counts of each response type is given in Figure 3.4. Significantly

Response Type	Pronoun	Reflexive			Other	
	him	*himself*	*self*	*own person*	Name	Demonstrative
Bound Mismatch	52.6%	35.6%	11%	0.8%	0%	0%
Bound Match	32.5%	48.7 %	16.5%	2.3%	0%	0%
Disjoint Mismatch	34.2%	0%	0%	0%	54%	11.8%
Disjoint Match	16.6%	0%	0%	0%	70.1%	13.3%

Table 3.7: Rate of Production by participant Response Type in Experiment 2. Translations of Participants' Responses as follows. Pronoun: 'him' / 'her' - *el / ea*; Reflexive: 'himself' / 'herself' - *el însuşi / ea însăşi*, 'self' - *sine*, 'own person' - *propria persoană*; Demonstrative: 'this one' - *acesta / aceasta*.

	Logistic Mixed Effects Model		
Factor	*Estimate*	*SE*	*z value*
Ambiguity	**1.61**	**0.24**	**6.77*** **
Picture Type	**-1.5**	**0.48**	**-3.12** **
Ambiguity x Picture Type	0.1	0.4	0.246

	Nested Model: Effect of Ambiguity		
Picture Type	*Estimate*	*SE*	*z value*
Local Bound	**1.56**	**0.3**	**5.21*** **
Local Disjoint	**1.66**	**0.32**	**5.09*** **

Table 3.8: Logistic Mixed Effects Model Estimates in Experiment 2. All significant effects are bolded. Legend: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

fewer pronouns were used in the *Match* conditions for both *Local Bound* and *Local Disjoint* contexts. To visualize this effect more clearly, *Figure 3.5* illustrates the rate of regular pronoun production across the four conditions, while *Table 3.8* lists the results of the main analysis.

Logistic mixed effects regression again revealed a main effect of Ambiguity (z = 6.654, SE = 0.24, $p < 0.001$), a main effect of Picture Type (z = -3.1, SE = 0.47, $p <$ 0.01), but, unlike in *Experiment 1*, the analysis did not reveal a significant effect of the interaction between the two factors. The nested model reveals a reliable effect for both *Local Bound* (z = 5.2 , SE = 0.3, $p < 0.001$) and *Local Disjoint* (z = 5.1, SE = 0.32, $p < 0.001$) conditions; the effect of Ambiguity was of comparable magnitude

Figure 3.4: Response Type Count in Experiment 2.

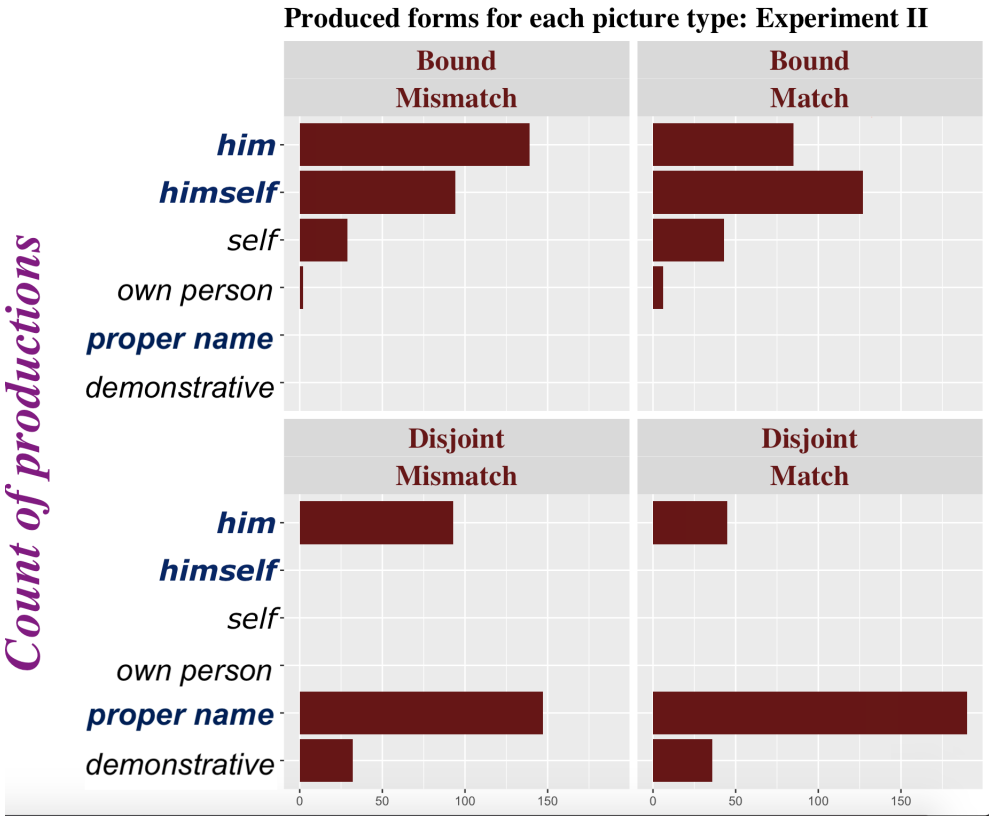
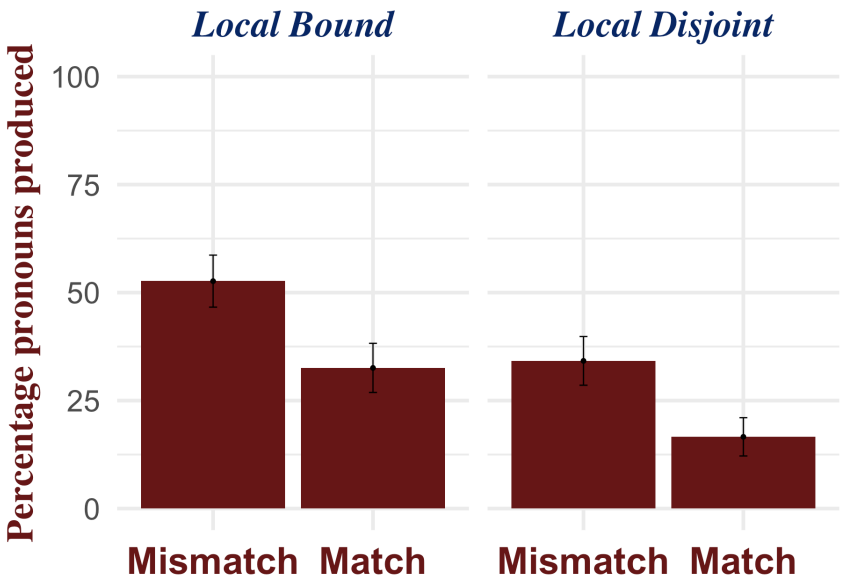


Figure 3.5: Rate of regular pronoun production in Experiment 2.



	Effect of Ambiguity		
Response Type	*Estimate*	*SE*	*z value*
REFLEXIVE EXPRESSIONS	**-1.64**	**0.33**	**-4.93*** **
PROPER NAMES	**-1.6**	**0.29**	**-5.49*** **

Table 3.9: Logistic Mixed Effects Model Estimates in Experiment 1 for the production of reflexive pronouns (Local Bound) and proper names (Local Disjoint). All significant effects are bolded. Legend: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

	ON-TARGET RATE	TARGET RESPONSES
BOUND MISMATCH	97%	264
BOUND MATCH	96%	261
DISJOINT MISMATCH	100%	272
DISJOINT MATCH	99.6%	271

Table 3.10: On-Target Response Rate by Condition in Experiment 2.

across the two picture types.

Secondly, the logisitic mixed effects regression model used to determine the effect of AMBIGUITY on the rate of *reflexive pronouns* and *proper names* also revealed reliable effects, the details of which are listed in *Table 3.9*. There was a significant effect of AMBIGUITY for both the rate of reflexive expressions in the *Local Bound* conditions ($z = -4.93$, $SE = 0.33$, $p < 0.001$), as well as the rate of proper names in the *Local Disjoint* conditions $z = -5.49$, $SE = 0.29$, $p < 0.001$).

Similarly to *Experiment 1*, with respect to the on-target responses, the *Bound Match* condition had the lowest rate (96%), however the target rates for the other three conditions were not significantly higher, ranging between 97% and 100%. The on-target response rate and the counts of target responses for each condition is given in Table 3.10. The post-hoc exploratory model that was run to test for differences between conditions for the rate of target responses revealed no significant effects of AMBIGUITY, PICTURE TYPE, and no significant interaction.

3.3.7 Discussion

Experiment 2, similarly to its counterpart for *referential subjects*, also revealed three primary results of interest. First, there was an overall main effect of AMBIGUITY ($p < 0.001$), with participants producing more regular pronouns in the *Mismatch* conditions than in the *Match* conditions. The nested model also revealed a significant difference in pronoun use between the *Mismatch* and *Match* conditions for both the *Local Bound* scenarios (20.1%), as well as for the *Local Disjoint* contexts (17.6%).

Second, as also predicted by BE CLEAR!, there is an effect of AMBIGUITY on the production of proper names and reflexive pronouns, as well. The rate of proper name production sees a significant ($p < 0.001$) increase of 25.9% from the *Disjoint Mismatch* to the *Disjoint Match* conditions. Reflexives are also more frequently used in ambiguous scenarios: a significant ($p < 0.01$) overall increase of 18.6% was observed from the *Local Bound Mismatch* to the *Local Bound Match* conditions across the various reflexive pronominal expressions produced (emphatic reflexives, the simplex reflexive *sine*, other reflexive constructions like *propria persoana* 'own person'). A significant ($p < 0.01$) increase of 13.1% is also observed in the rate of production for the emphatic reflexive *el însuşi*.

Third, as in *Experiment 1*, there was a main effect of PICTURE TYPE due to the overall higher rate of regular pronouns *el/ea* in the *Local Bound* conditions than in *Local Disjoint*. Comparing the *Mismatch* conditions, the difference in the production rate of *el/ea* between the *Local Bound* and the *Local Disjoint* conditions is 18.4%, and the difference between these two scenarios is 15.9% for the *Match* conditions. This indicates that when it comes to more complex contexts, with 4 relevant discourse referents, participants are less likely to use a pronoun to express disjoint reference from the local (quantified) subject.

Unlike in the first experiment, which targeted coreference and disjoint reference with *referential subjects*, there was no signficant interaction between the AM-

BIGUITY and PICTURE TYPE factors, the effect of AMBIGUITY being of comparable magnitude in the *Local Bound* (z = 5.2, SE = 0.3, $p < 0.001$) and *Local Disjoint* (z = 5.1, SE = 0.32, $p < 0.001$) conditions. The lack of this interaction is in line with the assumption that BE CLEAR! is taken into account in the reference computations of pronouns irrespective of their relationship with the local subject.

The results from *Experiment 2* indicate that the regular pronoun *el/ea* is the preferred surface form of bound variables in Romanian, as far as unambiguous contexts are concerned, with a production rate of 52.6% of all on-target response types for the *Local Bound Mismatch* condition. Unambiguously bound anaphors represent the rest of 47.4% in this condition, with the emphatic reflexive *el însuşi* being the preferred reflexive form of the three (35.6%). Once again, this finding supports morpho-syntactic competition based accounts of the Binding Theory Burzio (1989); Safir (2004, 2014); Rooryck & vanden Wyngaerd (2011), which derive the binding contraints by means of considerations regarding the morphosyntactic differences between pronominal forms. I return to this line of reasoning in *Section 3.5*. The comprehension experiments in Chapter 4 provide further evidence in favor of pragmatic and economy constraints *jointly* determining the pronominal form of bound variables.

The key finding of *Experiment 2* is that, surprisingly for accounts like Reinhart (1983a, 2006) and Roelofsen (2010), ambiguity avoidance strategies are also employed in the choice of surface form for variables bound by a local subject. In a language like Romanian, even though BE CLEAR! does not lead to grammaticized preferences like in English, it still has an effect on the reference computations of pronominals in the case of coreference and binding alike.

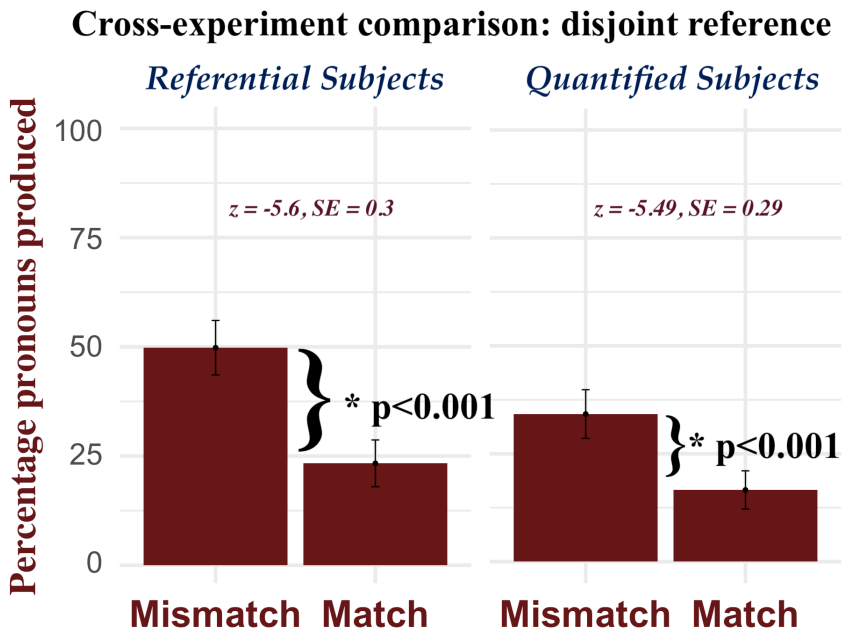
3.4 General Discussion

The aim of the two production experiments was to quantify the effect of AMBIGUITY on the choice of a pronominal form in intrasentential contexts. Dowty (1980)'s suggestion that ambiguity avoidance modulates the competition between reflexive and non-reflexive pronouns in the same syntactic environments serves as the inspiration for BE CLEAR!. Despite the large body of work in the psycholinguistic literature showing that ambiguity avoidance affects the choice of referring expression cross-sententially, there was a lack of evidence that the same strategy applies intrasententially. The two experiments provided evidence that a generic ambiguity avoidance constraint, BE CLEAR!, is substantiated. The effect of AMBIGUITY was qualitatively the same as the ambiguity avoidance effect found in the psycholinguistic literature for pronouns targeting a cross-sentential antecedent. Furthermore, the effect was of the same magnitude for coreferent and bound variable contexts, suggesting BE CLEAR! operates in the same manner in both syntactic contexts. This section discusses compares the results of the two experiments and discusses their theoretical contribution.

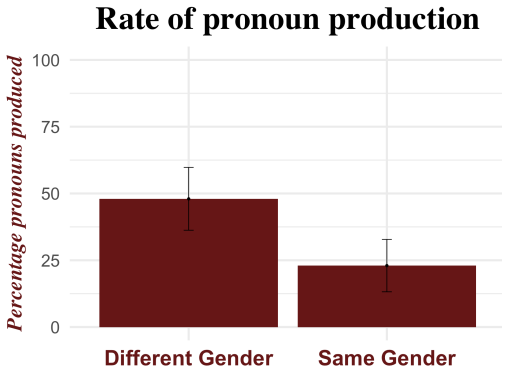
3.4.1 Disjoint Reference

The production study contributes to the psycholinguistic literature by investigating the role of contextual ambiguity in the production of pronouns which refer to a clausemate antecedent. As shown in *Figure 3.6*, there was a clear effect of AMBIGUITY in disjoint reference contexts. These results mirror existing experimental evidence in the psycholinguistic literature concerning pronouns targeting a referent in a previous sentence (Arnold et al., 2000; Fukumura et al., 2011, a.o.). The results from an Arnold & Griffin (2007) study are repeated in (115) for comparison.

Figure 3.6: Rate of regular pronoun production for disjoint reference across experiments: Experiment 1 (Referential Subjects) vs. Experiment 2 (Quantified Subjects).



(115) *Arnold & Griffin (2007) ambiguity avoidance results*



The effect of AMBIGUITY with respect to the production of pronouns which express disjoint reference is of comparable magnitude across the two experiments, whether the local subject is referential or quantificational. This effect is also qualitatively and quantitatively similar to the one reported in the literature for pronouns in English which refer to a cross-sentential antecedent, like Arnold & Griffin (2007). Despite the effect of AMBIGUITY being of the same size in the disjoint reference

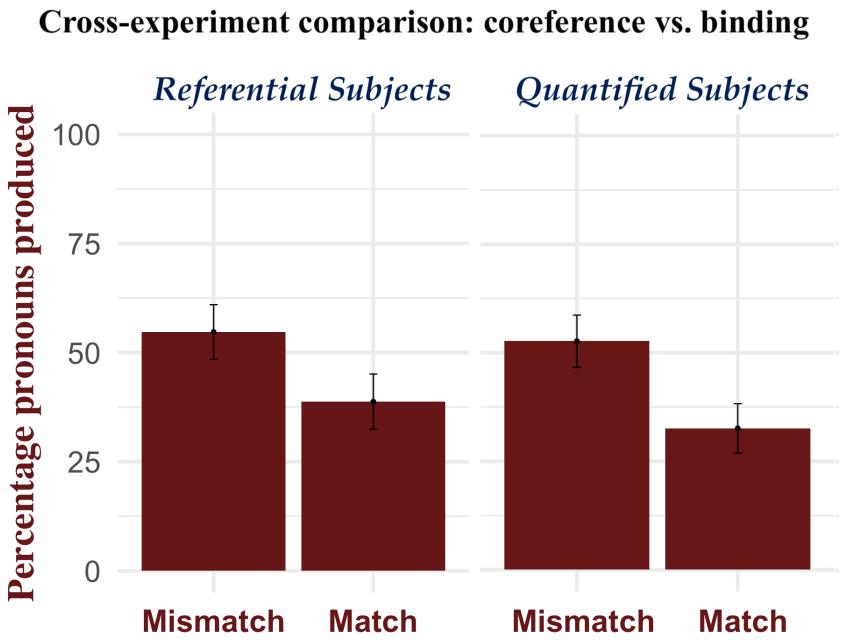
conditions of the two experiments, participants produced fewer pronouns in the unambiguous condition in *Experiment 2*. Descriptively, while the production rate of pronouns in the *Disjoint Mismatch* condition was of 50% in *Experiment 1*, pronouns were used in the same condition in 34.2% of the target responses in *Experiment 2*.

One possible motivation for this difference concerns not the type of subject (referential or quantified), but the number of referents in the given context. In *Experiment 1*, there were only two referents in all of the items, while in *Experiment 2*, there were four. The main finding of Arnold & Griffin (2007) is that participants were less likely to use a pronoun to refer to an antecedent introduced in a previous sentence if there were two referents in the context, irrespective of their gender. By manipulating the number of characters in their items, they found a higher mean of the use of pronouns in the single-character context, than in the two-character context, even if the pronoun would unambiguously pick out a referent. As mentioned above, Arnold & Griffin (2007) take this result as evidence against hypotheses which claim that ambiguity avoidance is a matter of *audience design*, and in favor of hypotheses which view this effect as resulting from the speaker's own accessibility of referents.

Arnold & Griffin (2007) conclude that the presence of additional characters in the context is correlated with a lower rate of pronouns in production. Based on their finding, it is perhaps expected that a drop in regular pronoun usage should occur in the *Disjoint Mismatch* condition in *Experiment 2*, where the discourse context included 2 additional referents.[8] A follow-up experiment on Romanian comparing these two conditions directly (2 referents vs. 4 referents) should find a similar effect. Such an effect would bolster the evidence in favor of ambiguity avoid-

[8]The "additional character" effect dicussed in Arnold & Griffin (2007) might be responsible for the drop in pronoun use in the *Disjoint* conditions in *Experiment 2* compared to *Experiment 1*, but there is no idication that this effect obtains for the *Bound* conditions. Under the assumption that bound variable LFs already unambiguously pick out a referent (Reinhart, 1984, 2006), the number of characters in a context would not be expected to impact the rate of pronoun production.

Figure 3.7: Rate of regular pronoun production in local coreference (Experiment 1: Referential Subjects) and locally bound variables contexts (Experiment 2: Quantified Subjects).



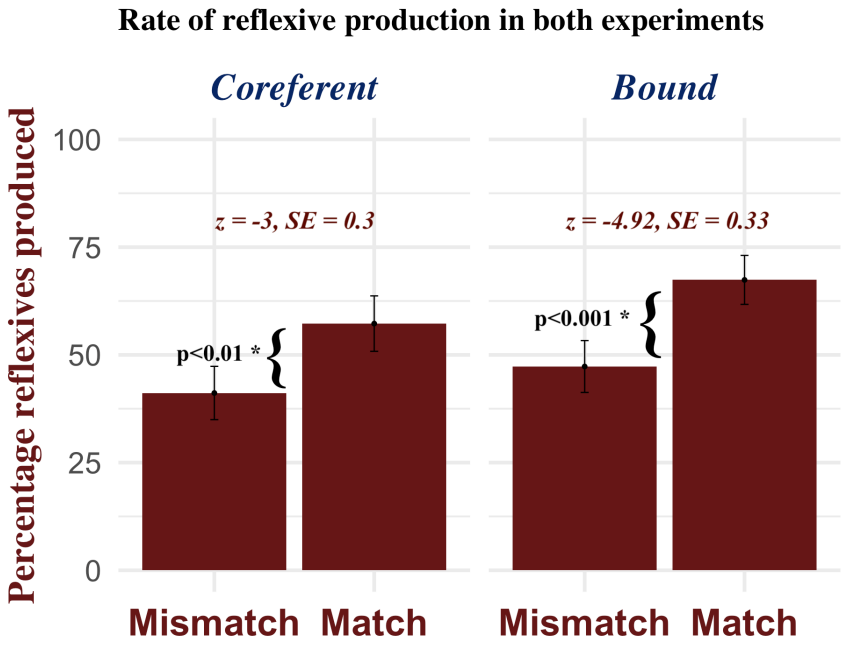
ance strategies as a matter of a speaker internal property, as opposed to audience design.

3.4.2 Regular and reflexive pronouns

With respect to ambiguity avoidance playing a role in the reference computations of pronouns targeting a local antecedent, *Experiment 1* provides evidence that this strategy is at play when the regular pronoun expresses coreference with the local subject, while the results of *Experiment 2* show that locally bound variables are subject to the same pragmatic pressures. Jointly, these two experiments indicate that the same pragmatic constraint, which I defined as BE CLEAR!, applies in Condition B environments irrespective of the syntactic relationship between the pronoun and the local subject: bound or coreferent.

In unambiguous coreferent and unambiguous bound contexts, the pronouns

Figure 3.8: Overall rate of reflexive pronoun production for local coreference (Experiment 1: Referential Subjects) and locally bound variables (Experiment 2: Quantified Subjects).



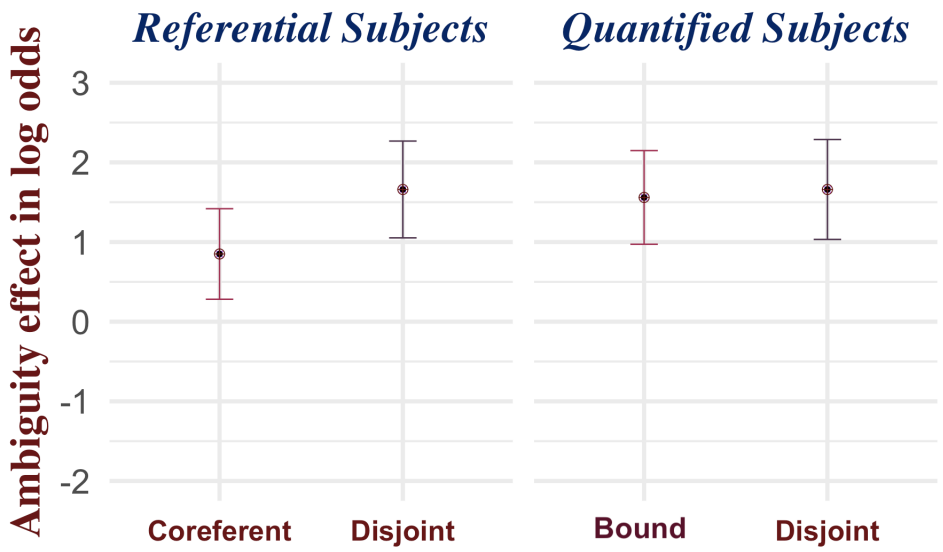
el/ea were the preferred pronominal form, with a rate of roughly 50% cross-experimentally, as illustrated in *Figure 3.7*. Crucially, in these unambiguous environments, reflexive expressions where not the preferred form. However, in pragmatic contexts where using a regular pronoun would have led to potential ambiguity, the emphatic reflexive was the most frequent. A side-by-side comparison of the production rates for reflexive forms (including the emphatic reflexive *el însuşi*, the simplex reflexive *sine*, and rare constructions *propria persoana* 'own person') in the *Local Coreferent* and *Local Bound* conditions in the two experiments is given in *Figure 3.8*. As predicted by BE CLEAR!, participants opted for *reflexive pronouns* more often in ambiguous contexts.

One surprising finding of both experiments concerned the low production rates of the simplex reflexive *sine*. In *Experiment 1*, *sine* made up 5% of the target responses in the *Coreferent Mismatch* condition, and 6.6% of the target responses in

the *Coreferent Match* condition. Similarly, in *Experiment 2*, participants produced *sine* in 11% of the target responses in the *Bound Mismatch* condition and in 16.5% of the target responses in the *Bound Match* condition. Like the emphatic reflexive, *el însuşi*, the reflexive *sine* is a bound anaphor which unambiguously refers to the local subject. Given *economy* assumptions, the simplex reflexive should be preferred over *el însuşi* from the standpoint of its morphosyntactic form, as well as its morphosemantic content (*sine* is *smaller*).

However, as the post-experimental interviews with the participants in the two experiments suggest, the simplex reflexive *sine* is now infrequent in spoken Romanian, particularly in informal environments (participants were instructed to imagine they were speaking to a friend). The average age of the participants was 20.4-21.4. Older generations, including mine, use *sine* more frequently in natural speech. I surmise that the Romanian anaphora system is in flux. This development regarding language change, at least at the level of register, might have played a role in how often the regular pronouns *el/ea* take on reflexive interpretations. According to syntactic-based competition accounts, specifically Rooryck & vanden Wyngaerd (2011), languages with dedicated reflexive anaphora should exhibit Condition B effects. Romanian *does* employ a variety of reflexive expressions, however, if the simplex reflexive *sine* is becoming underutilized, then it could be argued that the lack of Condition B effects for Romanian regular pronouns can indeed by captured by competition based accounts of the Binding Theory. On the other hand, this cannot be the only factor: participants who used *sine* also used regular pronouns in *Local Coreferent* and *Local Bound* scenarios. A longitudinal corpus study regarding pronominal expressions and the reference of *el/ea* in older versions of Romanian might shed some light on whether Condition B effects existed and whether their presence is correlated with the frequency of *sine*.

Figure 3.9: Effect Sizes in Experiment 1 and Experiment 2 by Picture Type



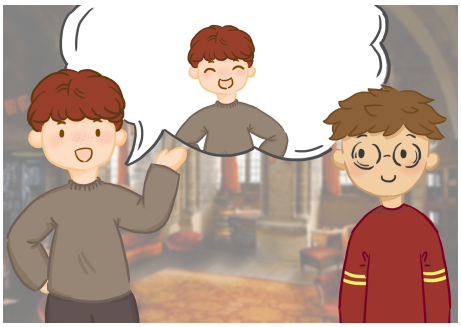
3.4.3 Ambiguity Effects

The main hypothesis of the production study was that a generic ambiguity avoidance constraint, BE CLEAR!, is employed in the choice of pronouns targeting antecedents within the same sentence. The prediction was that contextual ambiguity should lead to lower rates of regular pronouns *el/ea* in disjoint reference, coreference and bound variable environments. *Figure 3.9* illustrates the effect size of AMBIGUITY across the two experiments, as measured by means of the production rates of *el/ea*, in all four scenarios: local coreference, disjoint reference from a local referential subject, variables bound by a local quantified subject, and disjoint reference from a local quantified subject. As predicted, BE CLEAR!, is taken into account in the production rate of regular pronouns, with effect sizes of comparable magnitude for disjoint reference and locally bound variables. However, the effect of BE CLEAR! in the case of coreference is smaller, which might be due to an interaction between pragmatic and syntactic factors.

In the case of *Experiment 1*, as shown in the sample item (116), sentences were

only ambiguous between two readings: one where Andrei talks about himself (*reflexive)*, and one where Andrei talks about Mihai (*disjoint*).

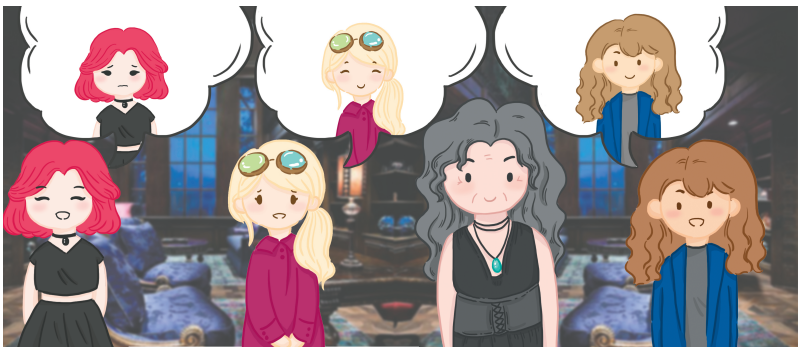
(116) **Sample Item *Experiment 1***



Acasă la Mihai, Andrei a vorbit despre el
home at Mihai, Andrei has talked about him
'At Mihai's house, Andrei talked about him '

A sample item from *Experiment 2* (with a regular pronoun continuation) is repeated in (117) below. This sentence is in fact compatible with 5 different interpretations in Romanian: one where every girl talked about herself (*reflexive*), one where every girl talked about her grandmother (*disjoint*), one where every girl talked about Monica, one where they all talked about Elena, and one where they all talked about Irina. Even though the 3 latter interpretations are perhaps less salient, they are still available. In this sense, then, the *Match* conditions in *Experiment 2* were the most ambiguous, hence BE CLEAR! could have arguably had an overall stronger effect in the second experiment. However, despite the difference in complexity between *Experiment 1* and *Experiment 2*, the effect of AMBIGUITY in the Disjoint conditions is comparable across the two experiments. Thus, it is unlikely that the difference in contextual complexity is the only factor in the lower effect size in the case of local coreference.

(117) **Sample Item *Experiment 2***



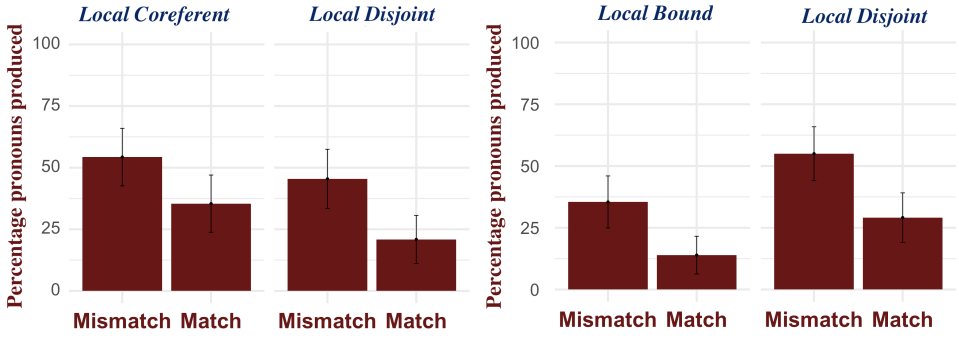
Acasă la bunica Laura, fiecare fată a vorbit despre ea.
home at grandma Laura, every girl has talked about her
'At Grandma Laura's house, every girl talked about her. '

Another speculation with respect to the difference between the two conditions in *Experiment 1* is that there is a bias for pronouns to express locally coreferent readings, which leads to a lower effect of AMBIGUITY in the *Local Coreferent* condition. As evinced by the rate of production of pronominal forms in unambiguous contexts, regular pronouns are the preferred means of expressing bound variables in Romanian. As I suggest in the following section, this preference can be captured by economy constraints which rank *smaller* pronouns above more complex ones (Safir, 2004, 2014; Patel-Grosz & Grosz, 2017). However, again, if this was the only factor motivating the different effect sizes, an expectation would have been for this difference to replicate in *Experiment 4*: a smaller effect of AMBIGUITY would have been expected in the *Bound* condition than in the *Disjoint* condition. This line of reasoning, of course, requires further experimental investigation.

3.4.4 Repeated Participants

Twenty of the 68 participants in *Experiment 2* had also taken part in *Experiment 1*. This subsection is an exploratory posthoc analysis of the results which compares

Figure 3.10: Repeated Participants: Experiment 1 (left) vs. Experiment 2 (right).

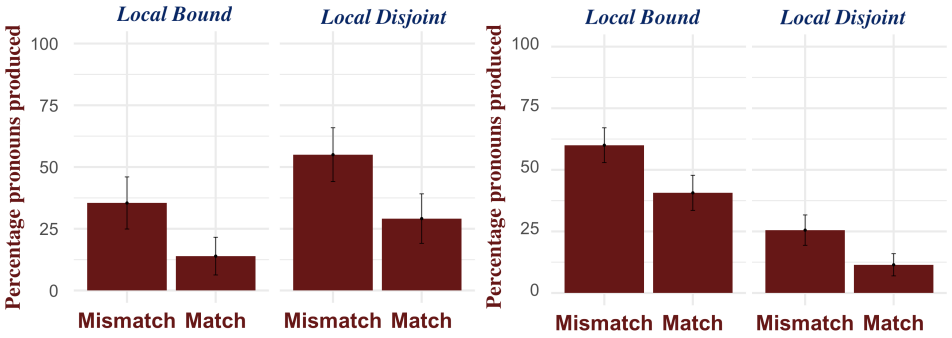


the results of the two subgroups: naive participants and repeat participants. Including *repetition* as a factor in the analysis of the results from *Experiment 2* did not prove to be statistically significant. However, due to the low sample size, a statistical analysis should be taken at face value and not assumed to generalize.

Descriptively, the pattern is as follows. The figure in *Figure 3.10* provides a side-by-side comparison of the performance of the 20 participants in *Experiment 1* (on the left), and of their performance in *Experiment 2* (on the right). The results indicate that the same 20 participants used more regular pronouns in the *Local Coreferent* conditions in *Experiment 1* (54.3% *Mismatch*, 35.4% *Match*) than they did in the *Local Bound* scenarios in *Experiment 2* (35.4% *Mismatch*, 13.9% *Match)*, and fewer regular pronouns in the *Local Disjoint* conditions in *Experiment 1* (45.5% *Mismatch*, 20.9% *Match*) than in *Experiment 2* (55% *Mismatch*, 29.1% *Match*). Given the small sample size, this difference between the two experiments might be due to factors other than their exposure to the first experiment.

However, when comparing the performance of the 20 repeat participants to that of the naive 48 participants in *Experiment 2*, as shown in *Figure 3.11*, it appears that the participants who also took part in *Experiment 1* used fewer regular pronouns in the *Local Bound* conditions and more pronouns in the *Local Disjoint* conditions than the group of naive participants. The difference between the two populations

Figure 3.11: Experiment 2: Repeated Participants (left) vs. New Participants (right)



suggests that the exposure to the first experiment on ambiguity avoidance led to participants using regular pronouns to express reflexive readings less often, and preferring to use these pronouns in disjoint reference scenarios. This observation is once again related to competition: if a speaker consistently uses a regular pronoun to express a bound variable reading, then the use of this pronoun in disjoint reference environments decreases (naive participants in *Experiment 2*). Similarly, if a speaker develops a type of Condition B effect, whereby regular pronouns are dispreferred as expressions of bound variables, pronouns are selected to express disjoint reference more often (repeated participants in *Experiment 2*). Nevertheless, both populations exhibit ambiguity avoidance effects.

Although interesting, the results reported in this subsection are not statistically informative. However, this pattern is related to the assumption of syntactic competition based accounts of the Binding Theory (Safir, 2004, 2014; Rooryck & vanden Wyngaerd, 2011, a.o.) that the competition between pronouns and reflexive pronouns is at the level of their morphosemantic content. While the two production experiments in this chapter focused on the competition between alternative sentences with reflexive and non-reflexive pronouns at the level of *meaning* (in line with pragmatic competition based accounts), the comprehension study in Chapter 4 investigates how this competition is modulated by the *form* of these pronominals.

3.5 Refining the competition

The experiments discussed in this chapter provide evidence in favor of BE CLEAR! modulating the competition between regular pronouns, reflexive pronouns and emphatic reflexives. At the same time, as discussed in *Chapter 2*, BE CLEAR! can only account for *preferences* in the case of pronominal forms in PP object positions, while in the case of clitics, it leads to rigid effects. Although participants used the less ambiguous *sine* and *el însuşi* more often in contexts where the regular pronoun *el* would have been ambiguous, participants preferred the regular pronoun *el* in contexts disambiguated by virtue of the gender of the referents.

I hypothesize that the selection of a pronominal form is not only constrained by BE CLEAR!, but also by a syntactic economy constraint, BE SMALL!, which ranks less syntactically complex expressions over more complex ones. Before introducing this constraint, let us consider the case of the French emphatic reflexive *lui-même*, which would also be affected by the hypothesized BE SMALL!.

In Safir (2004)'s system, although *himself* competes with *him* in English, the French emphatic *lui-même* is argued not to enter the competition with *lui*. Based on the data in (118), Safir (2004, p. 208) following Zribi-Hertz (1990), concludes that *-même* unambiguously enforces a coconstrued interpretation in contexts where *lui* would have preferentially been resolved to a non-local antecedent.

(118) a. *Pierre est jaloux de lui-*(même).*

Pierre is jealous of him-SAME
'Pierre is jealous of himself.'

b. *Pierre bavarde avec lui-*(même).*

Pierre chats with him-SAME
'Pierre is chatting with himself.'

(Safir, 2004, ex. (39), p.208)

Comparing (118) with (119), it becomes apparent that *-même* is obligatory only

when a coreferent interpretation would be unexpected. When the predicate comes with no bias against a reflexive reading, like in (119), *-même* is optional.

(119) a. *Pierre parle souvent de lui-(même).*

Pierre talks often about him-SAME
'Pierre often talks about himself.'

b. *Pierre travaille pour lui-(même).*

Pierre works for him-SAME
'Pierre works for himself.'

(Safir, 2004, ex. (39), p.208)

According to Safir (2004), *-même* is an adjunct[9] and not an argument head, like the pronoun *lui*. In Safir (2004)'s system, complex pronouns and simplex pronouns do not compete. Consequently, disjoint reference effects are not obtained for *lui* in the examples in (119), since there is no competition between the regular pronoun and its emphatic counterpart. Like in French, Romanian emphatic pronouns may be used to disambiguate a reflexive reading. The examples in (120) below are modeled after the French (119) and (118) above.

(120) a. *Pierre vorbeşte des despre el-(însuşi).*

Pierre talks often about him-SAME
'Pierre often talks about himself.'

b. *Pierre munceşte pentru el-(însuşi).*

Pierre works for him-SAME
'Pierre works for himself.'

[9] As illustrated by the structural possibilities Safir (2004) provides below.

(i) *Safir (2004)'s possible structures for lui-même*
a. $[_{DP}[_{D}$ pronoun$][_{NP}[_{AP}$ SAME$][_{NP}$[e]]]]
b. $[_{DP}[_{DP}$[e]$[_{NP}[_{N}$ pronoun]]] SAME]
c. $[_{DP}[_{DP}$ pro $[_{D}$ pronoun$][_{NP}$ e]]$[_{AP}$ SAME]]

(Safir, 2004, ex. (41), p.208)

c. *Pierre este gelos pe el-*(însuşi).*

Pierre is jealous of him-SAME
'Pierre is jealous of himself.'

d. *Pierre vorbeşte cu el-*(însuşi).*

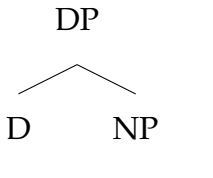
Pierre chats with him-SAME
'Pierre is chatting with himself.'

Safir (2004)'s approach to French emphatic pronouns can be extended to Romanian. According to Safir (2004)'s system, then, emphatic reflexive pronouns like *el însuşi* will not compete with regular pronouns like *el*, which predicts that the interpretation of regular pronouns should not be affected by the activation of emphatic reflexives. The comprehension experiments discussed in *Chapter 4* test this prediction and find evidence, contra Safir (2004), *in favor* of the competition between these two referential forms.

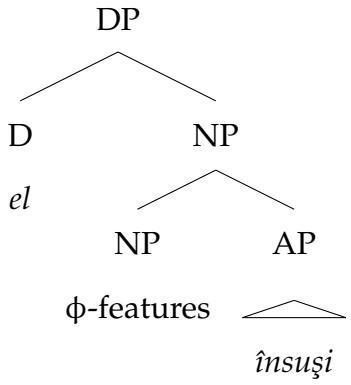
Like Safir (2004) and Rooryck & vanden Wyngaerd (2011), I assume that *lui-même* and *el însuşi* are more complex in their syntactic structure, including an AP adjunct *même / însuşi*, which, in Romanian, also agrees in ϕ-features with the pronoun it modifies.

(121) *Simplified Syntactic Structures*

a. *Regular Pronoun*



b. *Emphatic Reflexive*



However, unlike Safir (2004) and Rooryck & vanden Wyngaerd (2011), I propose

that regular pronouns and complex reflexives do compete, and, furthermore, that this competition is restricted by a syntactic economy constraint, along the lines of Burzio (1989, 1991). The formulation of the violable economy constraint below is adapted from Patel-Grosz & Grosz (2017)'s *Minimize DP*, which in turn is inspired by Schlenker (2005) and Johnson (2013)'s *Minimize Restrictors!*.[10]

(122) **BE SMALL!**

For any two DPs A and B, choose A iff:

i. A and B have the same denotation

ii. both A and B are grammatical in this position, and

iii. A has a proper subset of the syntactic nodes that B has.

Given the derivations in (121), BE SMALL![11] predicts that when it comes to the competition between *el* and *el însuşi*, *el*, the smaller DP, is preferred in contexts where these two pronominal forms achieve the same interpretation. On the other hand, BE CLEAR! would favor the emphatic reflexive over the regular pronoun. Under the assumption that both BE CLEAR! and BE SMALL! are active, these two violable constraints lead to different winners in the case of PP object pronouns. I argue that, given that the two constraints cannot converge on a sole winner, both forms are available in a neutral context, as shown by the experimental results in the unambiguous conditions of the production study. In the case of ambiguous contexts, like in the *Match* conditions in the production experiments, the effect of BE CLEAR! becomes apparent, participants having preferred the emphatic reflexive for the expression of a bound variable reading.

I further argue that the rigidity of the use and interpretation of Romanian clitics is also an artefact of the application of BE SMALL! and BE CLEAR!. The reflexive

[10] Although formulated differently, the competition between referential expressions is also modulated by constraints like BE CLEAR! and BE SMALL! in Ivan (2018) and Dillon & Johnson (2019).

[11] A more general effect of the third condition can also be derived by means of the competition between structurally derived contextual alternatives (Fox, 2011; Katzir, 2007), as Marty (2018) does in his reinterpretation of Johnson (2013) aiming to capture Principle C-like disjoint reference effects.

and non-reflexive clitics are equally syntactically complex, which means that BE SMALL! cannot distinguish between them. In this case, the effect of BE CLEAR! becomes grammaticized: unambiguous reflexive clitics are always preferred to ambiguous non-reflexive clitics.

The same reasoning applies to the competition between *him* and *himself* in English. Like Safir (2004) and Rooryck & vanden Wyngaerd (2011), I assume that *him* and *himself* have the same syntactic structure. Therefore, BE SMALL! cannot distinguish between the two alternatives, and the competition is only restricted by BE CLEAR!, which, like in the case of Romanian clitics, leads to a grammaticized preference of expressing reflexive readings via the reflexive pronoun.

Further evidence that both BE CLEAR! and BE SMALL! are active in English, comes from diachronic data. Similarly to Frisian and Middle Dutch, pronouns in Old English could express both disjoint reference as well as local coreference. The examples below illustrate that both the simplex *hine* as well as the complex *hine selfne*, where *self* is taken to be an emphatic adjunct which agrees with the pronoun, can be used reflexively. Furthermore, Rooryck & vanden Wyngaerd (2011) present evidence that the *self*-form was an intensifer: *hine selfne* can be used reflexively as well as non-reflexively.

(123) *Þa behydde Adam **hine** & his wif eac swa dyde* [Genesis 3.9, Crawford 1922]
'and Adam hid **himself** and his wife did the same'

(König & Siemund, 2000, ex. (32), p.56)

(124) a. *Ne lufað se **hine selfne** se ðe **hine** mid synnum bebint.*
'He who loads **himself** with sin does not love **himself**.'

b. *Moyses, se ðe wæs Gode sua weorð ðæt he oft wið **hine selfne** spræc ...*
'Therefore Moses, who was in such honor with God that he often spoke to **him**...'

(Rooryck & vanden Wyngaerd, 2011, ex. (36), p. 23)

As observed by Van Gelderen (2000) and König & Siemund (2000), in the course of development from Old English to Modern English, pronouns and the emphatic intensifer *self* were combined into a complex reflexive anaphor, *himself / herself*, that could unambiguously express coreference. Van Gelderen (2000) shows that Old English pronouns have inherent case, and that regular pronouns can be used reflexively. By Late Old English, verbal agreement disappears and the accusative case marking for first and second person is lost. While in Old English regular pronouns are used anaphorically in all syntactic environments (Van Gelderen, 2000, p. 109), in Early Middle English, *self* appears to preferentially be used with 3rd person pronouns expressing coreference. Van Gelderen (2000) argues that this shift can be explained due the gradual change of *self* from an adjective to a noun, as well as the change in morphology, namely the loss of case endings.[12] The correlation between the loss of case endings in English and the transition of regular pronouns to lose their ability of expressing reflexive readings is also observed by Sinar (2006).

Similarly to Safir (2004), Rooryck & vanden Wyngaerd (2011) argue that competition does not take place between regular simplex pronouns and complex reflexive DPs, which is why, in their view, *Principle B* effects did not arise in Old English. However, I argue that in Old English, like in Romanian, complex reflexives and regular pronouns *did* compete, and that this competition is modulated by both BE CLEAR! and BE SMALL!. Given that these two forms differ in terms of syntactic structure, BE CLEAR! and BE SMALL! do not converge: BE CLEAR! favors the complex *hine selfne*, while BE SMALL! favors the simplex *hine*. Similarly to Romanian, this competition does not lead to a clear winner, so both forms survive, with the effects of BE CLEAR! only being observed in ambiguous contexts.

One final wrinkle that should be addressed at this point concerns the simplex

[12]Inherent Case, which was present in Old English, is lost by the middle of the 13th century (Van Gelderen, 2000, p. 221). Under Reinhart & Reuland (1993), and later Reuland (2011)'s Chain Condition, if case is inherent, then pronouns are expected to be interpreted reflexively.

reflexive pronoun *sine* in Romanian. According to BE CLEAR! *sine* should be favored over the regular pronoun *el*, since it unambiguously expresses a reflexive relation. Furthermore, BE SMALL! would not distinguish between *el* and *sine*: these forms are equally complex. In essence, the prediction of BE SMALL! and BE CLEAR! is that *sine* should be the preferred form for reflexive expression in Romanian, and Principle B effects should obtain for the regular pronoun *el*, as in the case of the competition between *him* and *himself* in English. However, as observed in the experimental data, participants only opted for *sine* 5%-16.5% of the time, depending on the complexity of the context.

I take this as evidence that in the competition between different referential expressions, a form's frequency is also taken into account. I speculate that the infrequency of this pronoun, as evinced by the experimental data, and as reported anecdotally by participants who mentioned that *sine* is infrequently used in natural speech, is due to the fact that *sine* is not specified for gender, while the paradigm of regular pronouns and emphatic reflexives, as shown in *Chapter 2*, includes different forms for all ϕ-feature combinations. The dispreference for *sine*, then, could come from a morphological constraint which, like Rooryck & vanden Wyngaerd (2011)'s *Subset Principle*, requires that the chosen morphological exponent for a given pronominal should be the one that realizes the largest set of morphological features. However, I do not have evidence to support this claim, and leave the further exploration of *sine*'s cost for further research.

Given the infrequency of the reflexive *sine*, the comprehension experiments in *Chapter 4* focus on the competition between regular pronouns like *el* and emphatic reflexives like *el însuşi*. Under the hypothesis that pronoun comprehension is a function of pronoun production (Rohde & Kehler, 2014; Rohde, 2019), the effects of BE CLEAR! and BE SMALL! might also be observed in comprehension. The experimental data reported in the next chapter provides evidence that, contra Safir

(2004) and Rooryck & vanden Wyngaerd (2011), complex reflexives and regular pronouns do compete, and, furthermore, that this competition, modulated by BE CLEAR! and BE SMALL!, leads to a higher rate of disjoint reference interpretation of ambiguous regular pronouns when the emphatic reflexive is activated.

CHAPTER 4

PRONOUN COMPREHENSION

Pronominal resolution is a topic that has seen a significant amount of interest in the theoretical and psycholinguistic literatures alike. More often than not, the latter focuses on the resolution preferences of pronouns which refer to an antecedent in a previous sentence (Ehrlich, 1980; Corbett & Chang, 1983; Maryellen & MacWhinney, 1990; Ariel, 1990; Gordon et al., 1993; Grosz et al., 1995; Gundel, 1999; Arnold et al., 2000; van Gompel & Majid, 2004; Fukumura & van Gompel, 2015, a.m.o). With respect to pronouns targeting an intrasentential antecedent, the scales are tipped in favor of research which concerns the processing of pronouns and binding constraints, and the time-course of antecedent retrieval (e.g Nicol & Swinney, 1989; Badecker & Straub, 2002; Sturt, 2003; Xiang et al., 2009; Dillon, 2011; Clackson et al., 2011; Dillon et al., 2013; Kush, 2013; Chow et al., 2014; Cunnings & Sturt, 2014; Kush et al., 2015; Cunnings & Sturt, 2018), as opposed to the resolution of pronouns ambiguous between a reflexive and a non-reflexive interpretation (e.g. Kaiser & Trueswell, 2008; Kaiser et al., 2009; Conroy et al., 2009; Kaiser, 2013; Cunnings & Sturt, 2018). The main reason behind the skewed distribution of studies on intrasentential and intersentential pronominal resolution has to do with the fact that most psycholinguistic work is employed in English or English-like languages, where *Condition B* (Chomsky, 1986; Büring, 2005) is an active constraint. Given that

there is a strong, theoretically and experimentally documented (Nicol & Swinney, 1989; Gordon & Hendrick, 1997) bias for pronouns to be interpreted as disjoint in reference from a local clausemate antecedent, the investigation of pronominal reference in intrasentential contexts in English is less accessible.

In some languages, like Frisian (Everaert, 1986), Chamorro (Wagers et al., 2018), and Romanian, in which Condition B is not a grammaticized constraint, regular pronouns like *him* allow for both reflexive and non-reflexive interpretations. The aim of this chapter is to investigate the comprehension of pronouns in contexts where they are ambiguous between reflexive and non-reflexive interpretations, thereby extending the cross-linguistic psycholinguistic literature on pronominal reference, as well as testing the predictions of theoretical accounts of the *Binding Theory*. The main question, then, is how Romanian speakers, in particular, interpret pronouns which are ambiguous between reflexive and non-reflexive interpretations. A secondary question concerns how competition between different pronominal forms affects prononoun processing and resolution.

4.1 Resolving the ambiguity: three possibilities

With respect to the question regarding the interpretation of pronouns ambiguous between a reflexive and non-reflexive reading, there are three alternatives I consider. The first alternative falls under the *Binding is Easy* hypothesis (Wagers et al., 2018), which predicts that comprehenders will preferentially interpret the ambiguous pronouns as reflexive, given the assumption that bound variable LFs are 'easy', or less costly to compute than reference relations established at the level of discourse (Reinhart, 1983a; Reuland, 2001, 2011).

The second theoretically motivated alternative is that the preferred interpretation of ambiguous 3rd person pronouns will be that of disjoint reference, as predicted by pragmatic competition based accounts of disjoint reference effects Dowty

(1980); Levinson (1987). Under the assumption that speakers *avoid ambiguity* for the sake of cooperative communication, comprehenders would more readily interpret the regular pronoun *el* as disjoint, given that an unambiguous alternative, *el însuşi* 'him himself' is available.

Finally, the third alternative is that the interpretation of regular pronouns is a function of how these pronouns are used in production. According to Rohde & Kehler (2014) and Kehler & Rohde (2019), the relationship between production and interpretation is of a Bayesian nature: comprehenders calculate the probability of a pronoun being used by a speaker to achieve a certain interpretation. According to this view, the experimental results in *Chapter 3* should predict the comprehension results. In order to test this hypothesis, the two comprehension experiments discussed in this chapter investigate the same syntactic and discourse contexts as the production studies in *Chapter 3*.

The subsections below present these three alternatives in detail.

4.1.1 Binding is easy

As discussed in *Chapter 2*, *Rule I* (Reinhart, 1983a; Grodzinsky & Reinhart, 1993) and the *Coreference Rule* Roelofsen (2008, 2010) are grammatical constraints which state that, if a bound variable LF can achieve the desired meaning, then a speaker will choose the bound variable LF over other structures which might achieve the same meaning. While in Reinhart (1983b) the argumentation rests on pragmatic considerations, the underlying premise of *Rule I* is a matter of *economy*: bound variable LFs are preferred to coreference. This economy-based preference has been argued to be of a morphosyntactic nature (Burzio, 1989, 1991, 1996; Safir, 2004; Rooryck & vanden Wyngaerd, 2011, a.o.), or related to *processing costs* (Reinhart, 1983b; Reuland, 2001, 2011, 2017, a.o.). The core idea of the latter is that dependencies can be resolved at different levels (syntax, semantics, discourse) and that, at

the same time, there exists an economical hierarchy of the subsystems involved in binding computations, as in Reuland (2011), where $\alpha < \beta$ is taken to mean 'α is less costly than β'.

(125) *Economy of encoding*

Narrow syntax < syntax/semantics < discourse

(adapted from Reuland, 2011, ex. (6), p.125)

According to (125), mechanisms deployed in narrow syntax are less costly than procedures deployed at the syntax-semantics interface, which in turn are less costly than pragmatic considerations. Consequently, coreference, which is a discourse procedure, carries the heaviest processing load, and variable binding, which is a syntactic-semantic mechanism, is less costly than coreference.

Considering this perspective in the context of comprehension, bound variable LFs are 'easier' to construct, since, via the same reasoning employed above, comprehenders would achieve the bound variable parse syntactically, while coreference and disjoint reference would be computed at the level of discourse. Under this hypothesis, we might expect the reflexive/non-reflexive ambiguity in cases like (126) to be resolved as a reflexive interpretation, since comprehenders would achieve this reading by giving the string a bound variable parse, without referring to the discourse context.

(126) *Acasă la Mihai*$_1$, *Andrei*$_2$ *a vorbit despre el*$_{1/2}$.

home at Mihai Andrei has talked about him

'At Mihai's house, Andrei talked about him(self).'

This approach is also investigated in Wagers et al. (2018), as the *Binding is Easy* hypothesis, for which they provide evidence from an experimental study on Chamorro. Like Romanian, Chamorro is a language where the 3rd person pronoun, *gui'*, can be associated with both reflexive and non-reflexive readings, as illustrated in (127)

and (128) below. Wagers et al. (2018) propose that comprehenders adopt a bound variable interpretation of the *gui'* "virtually by default" (Wagers et al., 2018, p. 16), and that when permitted by the grammar, this interpretation is sometimes revised to disjoint. The experimental results from Wagers et al. (2018)'s picture-matching task shows that participants preferred to construe overt pronouns as coreferent with a local subject, despite the grammatical availabilty of both a disjoint and a reflexive reading.

(127) REFLEXIVE READINGS

a. *Kada påtgun ha pula' **gui'** gi kuatton-ña.*
each child AGR undress him LOC room-AGR
'Each child undressed himself in his room.'

(Wagers et al., 2018, ex. (13a), p.7)

b. *Put ennao na e sakrifisia **yu'**.*
because that COMP AGR sacrifice me
'For that reason, I sacrifice myself.'

(Wagers et al., 2018, ex. (3a), p.4)

(128) DISJOINT READINGS

a. *Kao un arerekla **(gui')** esta?*
Q AGR fix.PROG him/her already
'Have you already fixed him/her/*it up?'

(Wagers et al., 2018, ex. (2b), p.3)

b. *Ti måttu **yu'** gi gipot-mu sa' un na'bubu **yu'**.*
not AGR.come I LOC party-AGR because AGR make.angry me
'I did not come to your party because you made me angry'

(Wagers et al., 2018, ex. (2c), p.3)

In Chamorro, animate direct object and intransitive subject pronouns may be either null or overt; when overt in these syntactic positions, they are realized as weak

pronouns (Wagers et al., 2018). Crucially, Wagers et al. (2018) point out that a reflexive complement of the verb must be overt, irrespective of whether the referent is animate or inanimate. In this sense, replacing the bolded pronouns in (127) with null pronouns would render the sentences ungrammatical. Pronouns bound by an antecedent in a higher sentence may be either null or overt (Wagers et al., 2018, p. 8); when it comes to PP arguments, the ordinary independent pronoun is used.

(129) *Si Jose ha na'takkilu' i aliña giya* ***guiya***.
UNM Jose AGR make.high the pride LOC him
'Jose takes pride in himself.'

(Wagers et al., 2018, ex. (6b), p.5)

According to Wagers et al. (2018), *maisa*, an adverb which forms a prosodic word with the verb and which can, in some contexts, also mean *by oneself*, is an optional reflexive marker on the verb.[1]

(130) MAISA REFLEXIVE MARKING

a. *Ha* [*tokcha' maisa*] *gui' ni pakin tokcha'.*
AGR spear SELF him OBL gun.L spear
'He poked himself with the spear gun.'

(Wagers et al., 2018, ex. (4a), p.4)

b. *Hu [atan mamaisa]* ***yu'***.
AGR watch self.PROG I
'I'm looking at myself.'

(Wagers et al., 2018, ex. (4c), p.4)

Chamorro is also subject to a *Person Animacy Hierarchy* which disallows non-pronominal subjects in sentences with animate pronouns in the direct object position (Chung,

[1]The *maisa* data is compatible with Ahn (2010)'s description of emphatic VP markers.

2014). However, as shown in (127), reflexive and bound variable pronouns are exempt from this constraint. This observation leads to the assumption in Wagers et al. (2018) that Chamorro reflexives are minimal pronouns (whose only inherent feature is an index), which get their ϕ-features post-syntactically, via agreement with their antecedent. Consequently, in Chamorro, morphologically overt pronouns are ambiguous between minimal and *natural-born* pronouns (Wagers et al., 2018, p. 9). Guided by competition-based accounts of the Binding Theory, like Safir (2014), Wagers et al. (2018) argue that "natural-born" pronouns always lose the competition to minimal pronouns. Under the hypothesis that bound variable LFs are preferred to coreference relations (Reinhart, 1983a; Reuland, 2011) ambiguous pronouns are predicted to be preferentially interpreted as reflexive.

(131) SAMPLE STIMULUS IN WAGERS ET AL. (2018)

a. **Context Screen Sample**

Ⓐ

Context Screen

Umasagua si Felipe yan si Chai'. Umatgumementu i dos ni atdit ya mampus lalålu' i dos.
Felipe and Chai' are married. The two are arguing sharply and they're very angry.

b. **Critical Stimulus Type**

i. **Carrier Instruction**

Chonnik i puti'un guatu gi atyu na litrâtu ...

push the star there at that picture ...

'Push the star to that picture ...'

ii. **Target sentence**

anai ha patmåmada ***((mamaisa) gui')*** *ni panak lålu'* (*si Felipe*).

where AGR is.slapping SELF him with fly.swatter Felipe

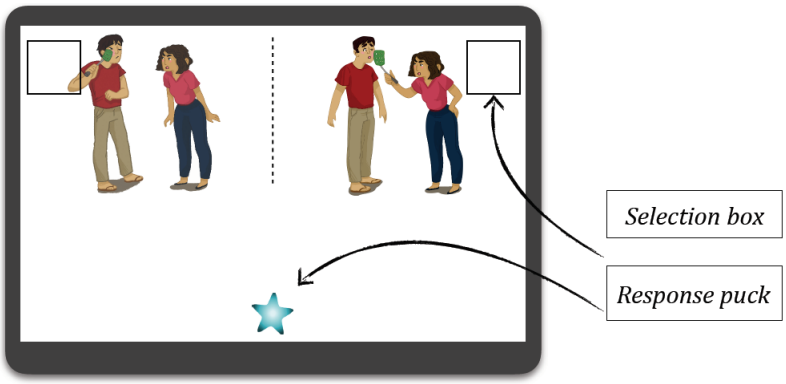
'where (Felipe) is slapping him(self) with a fly-swatter.'

adapted from Wagers et al. (2018, ex. (16), p. 10)

c. **Target Screen**

Ⓑ

Target Screen



Chonnik i puti'un guatu gi atyu na litråtu anai ha patmåmada gui' ni panak lålu'.

Push the star over to that picture where she$_i$/he$_j$ is slapping him$_j$ with a fly-swatter.

To test this prediction, Wagers et al. (2018) conducted a finger-tracking picture selection comprehension experiment of the 3rd person pronoun *gui'* in direct object position. As shown above, in the sample target sentence, the picture selection task had a 3 x 2 factorial design, crossing the PRONOUN TYPE factor with POTENTIAL BINDER. The 3 conditions of PRONOUN TYPE are *Null*, where no overt pronoun was used, *Gui'*, where the personal pronoun *gui'* surfaced in direct object position, and *Maisa Gui'*, which featured both the reflexive marker *maisa* as well as the 3rd person pronoun *gui'*. The *Potential Binder* factor manipulated whether the subject, was overt (*si Felipe* in the sample stimulus) or null.

The rate of reflexive interpretation for each condition is given in *Table 4.1*.[2] The rate of reflexive interpretation for the personal pronoun *gui'* is highlighted in blue.

[2]The results in the gray cell (7%), associated with the condition crossing a null direct object pronoun with a null pronoun binder, in fact reflect the results for what Wagers et al. (2018) call the *Non-reflexive Baseline*. Borja, the Chamorro co-author, found the initial sentence in this condition pragmatically odd, so they modified the experimental sentence from ha patmåmada ni panak lålu'

	OVERT POTENTIAL BINDER	NO OVERT POTENTIAL BINDER
GUI'	88%	79%
MAISA GUI'	99%	96%
NULL	13%	7%

Table 4.1: Percentage of Reflexive Picture Choices in Wagers et al. (2018).

The logistic regression analysis, conducted only on the *Gui'* and *Maisa Gui'* conditions, revealed a significant effect ($p < 0.001$) of the POTENTIAL BINDER factor, participants having chosen reflexive pictures more often when the subject was overt, and a significant effect of PRONOUN TYPE ($p \approx 0$), participants having chosen reflexive pictures more often in the *Maisa Gui'* condition. With respect to the RT data, Wagers et al. (2018) found that reflexive responses were given most quickly in the *Maisa Gui'* condition, that reflexive and disjoint readings for *gui'* have comparable initiation times, and that reflexive responses to *gui'* have comparable reaction times to disjoint responses in the *Null* condition.

The high rate of reflexive interpretations for the *Maisa Gui'* condition was expected, given that *maisa* is a reflexive marker. As for *gui'*, Wagers et al. (2018) concluded that the reflexive interpretation is preferred, even though the unambiguously reflexive *maisa gui'* construction is a competitor of the simple overt pronoun.

Romanian, like Chamorro, allows for null pronouns in direct object position, while pronominal objects of prepositional phrases must be overt. Under Wagers et al. (2018)'s proposal that bound variable interpretation is "virtually by default", a similar strong preference for a bound variable reading should also be found in PP contexts in both Chamorro or Romanian.

While Wagers et al. (2018)'s findings regarding the resolution of ambiguous pronouns in Chamorro lend some support for the *Binding is Easy* hypothesis, the Wagers et al. (2018) results cannot be clearly attributed to speakers having reached

'he/she is slapping him/her with a fly-swatter' to ha patmåmada ni panak lålu' **i fasun Felipe** 'he/she is slapping **Felipe's face** with a fly-swatter'. Grammatically, the revised target sentence can only receive a non-reflexive reading.

a bound variable interpretation, as predicted by the *Binding is Easy* hypothesis. In Wagers et al. (2018), the critical items feature referential antecedents: the reflexive reading can be achieved by means of coreference as well. Moreover, the preferential status of bound variable LFs is disputed in the psycholinguistic literature. For instance, Frazier & Clifton (2000) and Cunnings et al. (2014) provide experimental against a general principle which prefers bound variable LF. In the Frazier & Clifton (2000) and Cunnings et al. (2014) items, the reflexive reading can only be achieved by means of a bound variable LF, since the target antecedent is a quantified expression.

Following the assumptions laid out in Reinhart (1983b) and Grodzinsky & Reinhart (1993) with respect to *Rule I*, Frazier & Clifton (2000) test the *LF Only Hypothesis*, given in (132) below, according to which there is an overall advantage for bound variable interpretations over coreferential interpretations.

(132) *LF only/first hypothesis:*

> Bound-variable interpretations are preferred because the perceiver need only consult the LF representation (not the discourse representation) in order to identify the bound-variable analysis of the sentence.
>
> (Frazier & Clifton, 2000, ex. (3), p.126)

Like *Binding is Easy*, the hypothesis above predicts that there should be a general preference for bound variable interpretation of ambigous pronouns. Although Frazier & Clifton (2000) find evidence that bound variable interpretations are processed faster than coreferential interpretations in VP ellipsis contexts, this advantage does not extend to other contexts, such as those below.

(133) a. John says that everyone's mother loves him.

b. Jill says that everyone's mother loves him.

c. According to Sam, everyone loves his sister.

d. According to Ann, everyone loves his sister.

(Frazier & Clifton, 2000, ex. (11-12), p.134)

Frazier & Clifton (2000) investigated the interpretation of sentences like those in (133), which, in (133a) and (133c), are ambiguous between a bound variable reading, where *him* and *his* covary with *everyone*, and a coreference interpretation, where *him* and *his* refer to *John* and *Sam*, respectively. Contrary to the predictions of the *LF Only Hypothesis*, Frazier & Clifton (2000) find that in sentences where the pronoun was ambiguous between a bound variable and a coreference reading, as in (133a) and (133c), a bound variable interpretation was chosen 31% of the time, with coreference being the preferred interpretation in 67% of the tested scenarios. With respect to sentences where the gender of the antecedent blocks a coreferential reading, such as (133b) and (133d), which might arguably provide further advantage to the bound variable reading, only 39% of the chosen interpretations corresponded to bound variable LFs. Instead, 47% of the chosen interpretations were those where the pronoun resolved to an extrasentential antecedent, not present in the discourse, and despite the gender mismatch, 14% of the pronoun interpretations were coreferential with the grammatically improbable antecedent (*Jill/Ann*). Given that coreferential interpretation, which requires access to the discourse representation, was the overall preferred reading in contexts which allowed for both a coreferential and a bound variable reading, Frazier & Clifton (2000) conclude that their experimental findings clearly disconfirm the *LF Only Hypothesis*.

In a similar investigation, Cunnings et al. (2014) test the Reuland (2001, 2011) hypothesis that bound variable relations are established before coreference by means of an eye-tracking study, with items like those in (134), which include both a quantified phrase in subject position, in (134) *every soldier*, as well as a referential subject which does not c-command the pronoun, *James/Helen*. According to Cunnings et al. (2014), should variable binder antecedents be accessed before coreference an-

tecedents, the prediction would be that comprehenders initially attempt to resolve the pronoun to the quantifier phrase, which would lead to longer reading times in (134c) and (134d), where there is a gender mismatch between the pronoun and the stereotypical gender of the set of referents introduced by the quantifier phrase.

(134) *Cunnings et al. (2014) Eye-Tracking Sample Item*

a. *QP Match, Name Match*

The squadron paraded through town. Every soldier who knew that James was watching was convinced that he should wave as the parade passed. The entire town was extremely proud that day.

b. *QP Match, Name Mismatch*

The squadron paraded through town. Every soldier who knew that Helen was watching was convinced that he should wave as the parade passed. The entire town was extremely proud that day.

c. *QP Mismatch, Name Match*

The squadron paraded through town. Every soldier who knew that Helen was watching was convinced that she should wave as the parade passed. The entire town was extremely proud that day.

d. *QP Mismatch, Name Mismatch*

The squadron paraded through town. Every soldier who knew that James was watching was convinced that she should wave as the parade passed. The entire town was extremely proud that day

(Cunnings et al., 2014, ex. (7), p.43)

The results of the eye-tracking study reported in Cunnings et al. (2014) revealed longer reading times in the *Name Mismatch* conditions, as in (134b) and (134d), than in the *Name Match* conditions. No significant effect of the gender of the quantified phrase was found. Cunnings et al. (2014) interpret these results as evidence that

readers prefer resolving the pronoun to the proper name, rather than to the quantifier phrase, which fails to support the hypothesis that variable binding relations are computed before coreference assignment.

Cunnings et al. (2014) also investigated the preferred interpretation of pronouns ambiguous between a bound variable reading and a coreference reading in items which manipulate the linear order of the name and the quantifier phrase, as in (135) below.

(135) *Cunnings et al. (2014)'s Linear Order Sample Item*

a. *QP - Name*

The squadron paraded through town. Every soldier who knew that James was watching was convinced that he should wave as the parade passed.

b. *Name-QP*

The squadron paraded through town. It looked to James that every soldier was completely convinced that he should wave as the parade passed.

(Cunnings et al., 2014, ex. (9), p.49)

Cunnings et al. (2014) report that participants preferred to resolve the pronoun to the referential antecedent in (135a), and to the quantifier phrase in (135b). Cunnings et al. (2014) interpret these results as evidence that variable binding is preferred to coreference only when other factors, such as antecedent linear order, come into play, and conclude that their results do not support the theoretical hypothesis that variable binding is *easier* or considered before coreference relations.

Although the evidence that a *Binding is Easy* principle operates in comprehension is unclear, it is theoretically and empirically important to determine whether such a principle is active in Romanian. If the experimental results of the two comprehension studies discussed in this chapter reveal that comprehenders exhibit a

strong preference for bound variable readings, this would establish that the key assumption of Wagers et al. (2018)'s *Binding is Easy* hypothesis, and of grammatical constraints like *Rule I / the Coreference Rule* (Reinhart, 1983a; Grodzinsky & Reinhart, 1993; Roelofsen, 2010; Reuland, 2011), namely that bound variable LFs are prioritized, holds.

4.1.2 Pragmatic listeners: Avoid ambiguity

A prediction of pragmatic competition-based accounts of disjoint reference (Dowty, 1980; Levinson, 1987) is that, in comprehension, the preferred interpretation of pronouns ambiguous between a reflexive and non-reflexive reading should be that of disjoint reference. Under the assumption that speakers attempt to be *maximally informative*, the hearer's strategy is to reject a reflexive interpretation of a non-reflexive pronoun. Should this pragmatic reasoning be consistently enforced, the prediction is that the experimental results will show an overwhelming preference for disjoint reference readings of ambiguous pronouns.

The production experiments discussed in *Chapter 3* provide evidence in favor of a general pragmatic principle which applies to binding and coreference alike, BE CLEAR!. Unlike in the case of English or Romanian clitic-doubled pronouns, however, BE CLEAR! is not a decisive constraint in the case of non-clitic doubled pronouns in Romanian, given that Romanian regular pronouns are used to express both reflexive and non-reflexive readings. Nonetheless, the experimental results show that the production of regular pronouns like *el/ea* is modulated by contextual ambiguity: fewer regular pronouns were produced in ambiguous contexts than in unambiguous contexts.

(136) **BE CLEAR!**

Given a context C, when choosing between two alternative sentences, S and S', both of which include a non-logophoric pronominal form in the same

syntactic position, speak S′ iff:

i. S and S′ have *indistinguishable interpretations* in C, and

ii. the set of possible interpretations for S′ is a **proper subset** of the set of possible interpretations for S.

The comprehension experiments discussed in this chapter provide a complementary test of the role of BE CLEAR! in Romanian. Under the assumption that hearers expect speakers to be maximally informative, If BE CLEAR were a hard or highly ranked constraint, the prediction would be that the use of a regular pronoun will, more often than not, generate a disjoint reference implicature.

4.1.3 Simple inference via Bayes' rule

A third, minimal approach would be to assume that there is no hearer-specific principle guiding listeners behavior in resolving this particular pronominal ambiguity. One way that we can make precise this intuition is to adopt a probabilistic approach to reference (e.g. Frank & Goodman, 2012; Kehler et al., 2008), which holds that: (i) listeners will treat pronoun resolution as an inference problem, and (ii) that listeners will use implicit knowledge of their own production choices to guide that inference process. Rohde & Kehler (2014) provide one way of quantifying the interpretation bias of a pronoun by means of a Bayesian model[3] of intersentential pronominal reference, given below.

(137) *Bayes' Rule for pronouns*

$$P(\text{referent}|\text{pronoun}) = \frac{P(\text{pronoun}|\text{referent}) * P(\text{referent})}{P(\text{pronoun})}$$

[3]Bayes's Rule, in its most general form, is:

(i) *Bayes' Rule*

$$P(A|B) = \frac{P(B|A) * P(A)}{P(B)}$$

Under this view, the term P(referent|pronoun), also called the *interpretation bias*, represents the probability of the speaker intending to refer to a particular referent given that a pronoun occurred. P(pronoun|referent), on the other hand, represents the *production bias*: the probability, assuming an intended referent, that a speaker would have used a pronoun. P(referent) is the probability that a particular referent will be mentioned next, while P(pronoun) represents the overall likelihood of a pronoun ocurring. Rohde & Kehler (2014)'s Bayesian model posits that comprehenders' interpretation bias will be a function of the likelihood of reference to an antecedent (see Arnold, 2010, as well), combined with knowledge about how likely speakers are to use a given pronoun type to refer to an antecedent.

The data from the experiments discussed in *Chapter 3* represent the overall production bias: the probability that a pronoun will be used, given an intended referent. Having this data handy, *Bayes' Rule* provides a convenient way of calculating the interpretation bias, without the assumption of comprehension-specific pronoun interpretation biases on behalf of the comprehender other than the inferences licensed by *Bayes' Rule*. The production study in *Chapter 3* consists of an experiment targeting referential subjects for reflexive interpretation, and of an experiment which looks at binding relations proper, with quantified subjects. Although the conditions of the production and comprehension experiments do not perfectly overlap, we can, however, rely on the overall production data to predict the overall comprehension data for each set of experiments. The table in *Table 4.2* above lists the rate of production for the regular pronouns *el/ea* 'him/her' in the four conditions for both production experiments.

Given the low number of observations per individual item, it is unlikely that accurate item-by-item predictions can be made based on the production data. In real-time comprehension, there are other factors that come into play, such as the probability of a reflexive reading given a specific predicate. However, *Bayes' Rule*

	Referential Subjects	Quantified Subjects
Reflexive Mismatch	54.5%	52.6 %
Reflexive Match	39.1%	32.5 %
Disjoint Mismatch	49.6%	34.2%
Disjoint Match	23%	16.6%
Overall Reflexive	46.8%	42.55%
Overall Disjoint	36.3%	25.4%
Overall Pronoun Use	41.7%	33.89%

Table 4.2: Percentage of Regular Pronoun Production out of on-target Responses by Condition in Experiments 1 and 2.

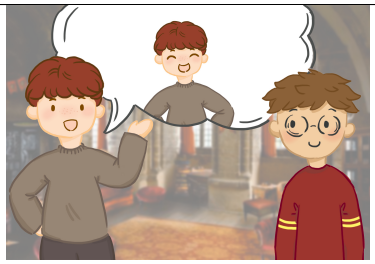
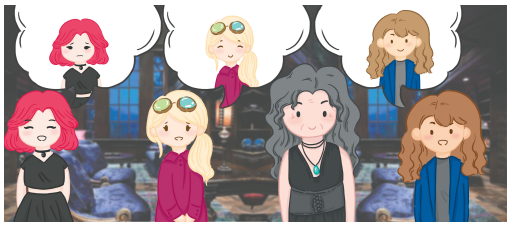
	Referential Subjects	Quantified Subjects
Sample Picture		
P(*el* | reflexive)	0.468	0.425
P(*el* | disjoint)	0.363	0.254
P(*el*)	0.417	0.3389

Table 4.3: Estimated Probabilites from Production Data.

can be applied as a general probability equation, collapsing over items and conditions. Based on the results from the production experiments, we can estimate the probability that a speaker would use a regular pronoun to achieve a reflexive interpretation, namely P(*el* | reflexive), the probability of a regular pronoun to achieve a disjoint interpretation, P(*el* | disjoint), as well as P(*el*), the overall probability of a speaker using the pronoun *el*. These probabilites are listed in *Table 4.3*.

By virtue of the design of the production and comprehension studies, we can also estimate the probability of an intended reading, namely P(reflexive) and P(disjoint). The predicates used in these items had been normed offline to ensure that there is no strong intrinsic bias towards a reflexive or a disjoint interpretation. This allows

for the assumption that the probabilities of a reflexive or a disjoint interpretation given any of these predicates are roughly equal. In addition, the experimental instructions asked participants to assume that the only referents in the context of each item are those presented in the target picture and sentence set, thereby minimizing the probability of referring to a referent outside the given discourse. While an exact estimate of p(reflexive) and p(disjoint) is out of reach, given the experimental setup which disallows other readings and the offline predicate norming, we can assume that p(reflexive) = 1 - p(disjoint). Furthermore, by means of conditional probabilities, given that we know p(*el* | reflexive), p(*el* | disjoint) and p(*el*), the production data also provides a way of calculating p(reflexive) and p(disjoint).

$$P(el) = P(el|\mathtt{reflexive}) * P(\mathtt{reflexive}) + P(el|\mathtt{disjoint}) * P(\mathtt{disjoint})$$

Replacing p(reflexive) with 1-p(disjoint), according to the assumption that there are no other available interpretations in the experimental setup, we obtain the following equivalence. Then, by inputting the data from *Table 4.3* into this equation, we come to the estimated p(reflexive) and p(disjoint) given in *Table 4.4*. As mentioned above, the predicates used in the experimental items had been normed offline to ensure that both reflexive and disjoint interpretations are equally available.

$$P(el) = P(el|\mathtt{reflexive}) * (1 - P(\mathtt{disjoint})) + P(el|\mathtt{disjoint}) * P(\mathtt{disjoint})$$

The estimated p(reflexive) and p(disjoint) in *Table 4.4* reflect the probabilities of these interpretations in the production experiments. With respect to the comprehension experiments, which have a similar design and the same stimuli as in the production tasks, it is likely that the values of p(reflexive) and p(disjoint) are similar to the estimated probabilities in the production task. However, instead of assuming that p(reflexive) and p(disjoint) in production are exactly replicated in

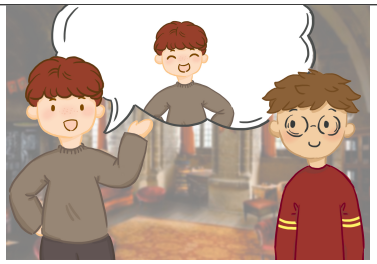
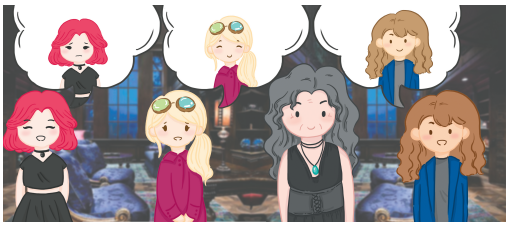
	REFERENTIAL SUBJECTS	QUANTIFIED SUBJECTS
Sample Picture		
P(*el* | reflexive)	0.468	0.425
P(*el* | disjoint)	0.363	0.254
P(*el*)	0.417	0.3389
P(reflexive)	0.5143	0.496
P(disjoint)	0.4857	0.503

Table 4.4: Estimated Probabilites in the Production Experiments.

comprehenshion, we can cautiously assume that in comprehension, these probabilities are within a [-0.1, +0.1] confidence interval with respect to their production counterparts.[4] Under this assumption, we predict the ranges for the probabilities of reflexive or disjoint interpretation given the potentially ambiguous pronoun *el* in *Table 4.5*. [5]

One wrinkle regarding these predictions concerns the simplifcation that the reflexive and disjoint readings are the only available interpretations across both sets of experiments. While this is true in the *Referential Subjects* case, with respect to the *Quantified Subjects* experiments, however, there are four characters in the pic-

[4]This assumption is also borne out in item-by-item applications of *Bayes' Rule*. Assuming the general p(reflexive) ranges between 0.4 and 0.6 for each item, the production data is a good predictor of comprehension. Despite the low number of observations for each of the 15 items in the comprehension study (22-24 observations per ambiguous predicate in *Experiment 3*, for instance), all predicates fall within 3 standard deviations of the predicted means of reflexive interpretations for each individual predicate. Of the 15 items, 14 fall within two standard deviations of the predicted means.

[5]Given the estimated interval of P(reflexive) and P(disjoint), P(reflexive|el) and P(disjoint|el) have been normalized. For instance, P(reflexive|el) was obtained using the following equation:

$$\mathrm{P}(\mathrm{reflexive}|el) = \frac{\mathrm{P}(el|\mathrm{reflexive}) * \mathrm{P}(\mathrm{reflexive})}{\mathrm{P}(el|\mathrm{reflexive}) * \mathrm{P}(\mathrm{reflexive}) + \mathrm{P}(el|\mathrm{disjoint}) * \mathrm{P}(\mathrm{disjoint})}$$

Consequently, instead of the denominator being P(el) = 0.4155 in the *Referential Subjects* case and P(el) = 0.34 for *Quantified Subjects*, the denominator ranged from 0.406 to 0.427, and 0.321 to 0.355, respectively.

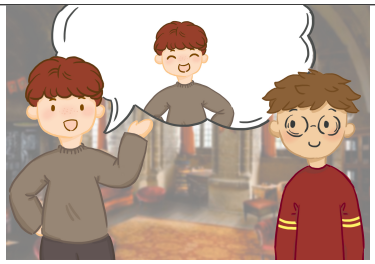
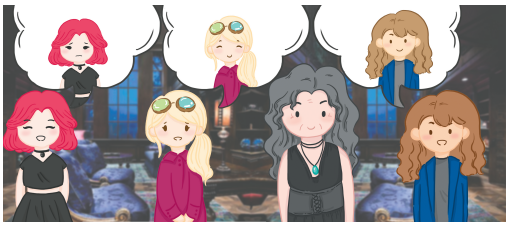
	REFERENTIAL SUBJECTS	QUANTIFIED SUBJECTS
Sample Picture		
P(*el* | reflexive)	0.468	0.425
P(*el* | disjoint)	0.363	0.254
P(*el*)	0.417	0.3389
P(*reflexive*)	[0.4143, 0.6143]	[0.396, 0.596]
P(*disjoint*)	[0.3857, 0.5857]	[0.403, 0.603]
P(reflexive | *el*)	**[0.477, 0.672]**	**[0.523, 0.712]**
P(disjoint | *el*)	**[0.327, 0.523]**	**[0.287, 0.477]**

Table 4.5: Predicted Comprehension Results via Bayesian Inferencing.

ture and context, which means that a regular pronoun could, in principle, obtain 5 readings: the typical disjoint reading where all three speakers talk about the older character, the reflexive reading where each speaker talks about themselves, as well as three different readings where all 3 speakers talk about one of the younger referents (in this case, either about Monica, Elena, or Irina). However, given the design of the comprehension experiment, a sample item of which is given in (138) below, we can make the simplfied assumption that the likelihood of each of the latter three readings in the overall experiment is low.

(138) a. **Context Screen**:

Bunica Laura a fost vizitată recent de către familie. Monica,
grandma Laura has been visited recently by family Monica
Elena şi Irina au fost şi ele prezente.
Elena, and Irina have been and them present
'Grandma Laura was recently visited by his family. Monica, Elena and Irina were present too.'

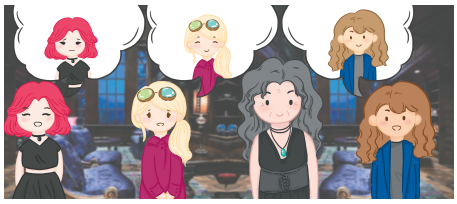
b. **Target sentence (presented auditorily):**

Acasă la bunica Laura, fiecare fată a vorbit despre ea.

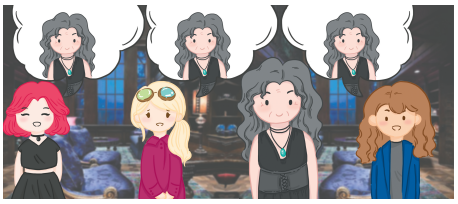
home at grandma Laura, every girl has talked about her

'At Grandma Laura's house, every girl talked about her(self). '

c. **Target Screen**:



D



K

As illustrated in (138), comprehenders are forced to choose between two readings: the reflexive reading, where the girls talk about themselves, and the disjoint reading, where the girls talk about Grandma Laura. Furthermore, the context which precedes the experimental items introduces the three girls as a set *Monica, Elena and Irina were present too*. The context, paired with the target sentence where the three girls are referenced as a set by means of a quantified expression, *every girl*, and the enforced availability of only two of the 5 potential readings for the pronoun *ea* in the sentence in (138), conspire against the three readings where all of the girls talk about either Monica, Elena or Irina. However, we cannot assume that these three potential interpretations are entirely disregarded in the computation of the meaning of the target sentence. Given this state of affairs, it means that the probability of a reflexive reading is lower than in the *Referential Subjects* experiment, and it is quite likely the probabilities of the desired reflexive and disjoint readings might differ from those predicted in *Table 4.5*.

Once again, the Bayesian model discussed in this section is not a proposal for pronoun comprehension, but merely a toy implementation of the hypothesis that comprehension patterns are best captured as a function of production biases. Prob-

abilistic inferencing, unlike the *Binding Is Easy* and *Pragmatic Listeners* alternatives, does not predict that comprehenders should exhibit a clear preference for reflexive or disjoint interpretations of ambiguous pronouns. Instead, we expect that the rate of reflexive interpretation should not greatly differ from the rate of disjoint interpretation across the two experiments.

4.2 Competition between forms

A secondary purpose of this chapter is to investigate whether comprehenders' interpretation of a given pronominal form is affected by the set of possible referential expressions that could achieve the same meaning, as predicted by the assumption that referential forms compete in a given syntactic position.

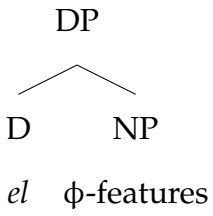
Following Burzio (1989), Safir (2004), Safir (2014) and Rooryck & vanden Wyngaerd (2011) argue that referential expressions are ordered from least to most specified, and that this hierarchy corresponds to the choice of a morphological exponent of bound variables. Under this view, null pronouns (if available) are the preferred means of expressing bound variable relations, followed by specialized reflexive pronouns like *himself*, regular pronouns, and, lastly, referential DPs (or full NPs). While competition between forms is a general phenomenon, according to Safir (2004) and Rooryck & vanden Wyngaerd (2011), complex reflexives like the French *lui-même* do not compete with simplex pronouns like *lui*. Consequently, in their accounts, the interpretation of regular pronouns is not affected by the availability of a complex reflexive in the same syntactic position.

The complexity of emphatic reflexives like *lui-même*, and by extension the Romanian *el însuşi*, is due to their syntactic structure (Safir, 2004). Comparing the two syntactic derivations given below, regular pronouns are *smaller* than emphatic reflexives. While regular pronoun DPs are only made up of a definite determiner and an NP which carries the ϕ-feature bundle, emphatic reflexives also contain an AP

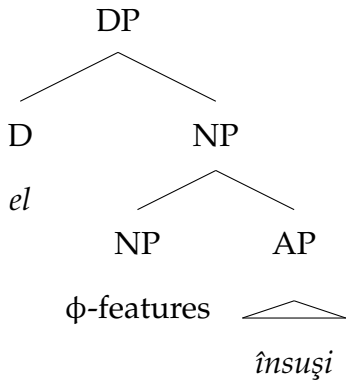
adjunct that agrees in ϕ-features with the NP.

(139) *Simplified Syntactic Structures*

a. *Regular Pronoun*



b. *Emphatic Reflexive*



However, as outlined in *Chapter 3*, I propose that regular pronouns and complex reflexives do compete, and, furthermore, that this competition is restricted by the following violable economy constraint, adapted from Patel-Grosz & Grosz (2017)'s *Minimize DP!*.

(140) **BE SMALL!**

For any two DPs A and B, choose A iff:

i. A and B have the same denotation

ii. both A and B are grammatical in this position, and

iii. A has a proper subset of the syntactic nodes that B has.

In my system, both regular pronouns and emphatic reflexives are used to express a bound variable reading by virtue of the fact that the two constraints on the competition between these two forms, BE SMALL! and BE CLEAR!, do not converge. BE SMALL! predicts that when it comes to the competition between *el* and *el însuşi*, *el*, the smaller DP, is preferred. Its pragmatic counterpart, BE CLEAR! predicts the opposite: *el însuşi* should be preferred to the regular pronoun *el*. Under the

Response Type	Pronoun	Reflexive			Other	
	him	*himself*	*self*	*own person*	Name	Demonstrative
Coreferent Mismatch	54.5%	33.9%	5%	2.5%	4.1%	0%
Coreferent Match	39.1%	48.9 %	6.7%	1.3%	3.5%	0.5%
Disjoint Mismatch	49.6%	0%	0%	0%	45.9%	4.5%
Disjoint Match	23%	0%	0%	0%	73.2%	3.8%

Table 4.6: Rate of Production by participant Response Type in Experiment 1. Translations of Participants' Responses as follows. Pronoun: 'him' / 'her' - *el / ea*; Reflexive: 'himself' / 'herself' - *el însuşi / ea însăşi*, 'self' - *sine*, 'own person' - *propria persoană*; Demonstrative: 'this one' - *acesta / aceasta*.

Response Type	Pronoun	Reflexive			Other	
	him	*himself*	*self*	*own person*	Name	Demonstrative
Bound Mismatch	52.6%	35.6%	11%	0.8%	0%	0%
Bound Match	32.5%	48.7 %	16.5%	2.3%	0%	0%
Disjoint Mismatch	34.2%	0%	0%	0%	54%	11.8%
Disjoint Match	16.6%	0%	0%	0%	70.1%	13.3%

Table 4.7: Rate of Production by participant Response Type in Experiment 2. Translations of Participants' Responses as follows. Pronoun: 'him' / 'her' - *el / ea*; Reflexive: 'himself' / 'herself' - *el însuşi / ea însăşi*, 'self' - *sine*, 'own person' - *propria persoană*; Demonstrative: 'this one' - *acesta / aceasta*.

assumption of Rohde & Kehler (2014) and Rohde (2019) that pronoun interpretation is a function of pronoun production, the comprehension experiments can also inform whether emphatic reflexives and regular pronouns compete when it comes to the expression of a reflexive reading. Based on the rates of use for these forms observed in the production experiments, repeated below in *Table 4.6* and *Table 4.7*, we expect the competition between regular pronouns, emphatic reflexives and demonstratives to unfold as follows.

Across the two experiments, Romanian speakers gave *el însuşi* 41.77% of the time for a reflexive interpretation, in the *Coreferent* and *Bound* conditions, and they never used *el însuşi* in a disjoint context. This suggests that *el însuşi* is very strongly associated with a reflexive meaning. With respect to demonstrative pronouns, we observe that in the production experiments Romanian speakers opted for *acesta*

8.35% of the time across the *Disjoint* conditions in both studies, and 0.125% of the time in reflexive contexts. While *acesta* is very strongly associated with disjoint reference, it appears to be less strongly associated with disjoint reference than *el însuşi* is for reflexive reference. To quantify the strength of these associations, let us suppose that comprehenders have an implicit knowledge of the probability of different forms given a meaning, and allow the production percentages to serve as provisional estimates of these probabilities.

(141) *Estimated Listener Prior Probabilities*

P(*el însuşi*|reflexive) = 0.4177

P(*el însuşi*|disjoint) = 0

P(*acesta*|reflexive) = 0.00125

P(*acesta*|disjoint) = 0.0835

We can use these probabilities to quantify the strength of each form as a cue to its preferred interpretation by computing *Bayes Factors*, which in this case, is the ratio of the probabilities of the two interpretations, given a form. The Bayes Factors are the odds of one interpretation over another:

(142) *Bayes Factors*

$$\frac{\mathrm{P}(\mathtt{reflexive}|\textit{el însuşi})}{\mathrm{P}(\mathtt{disjoint}|\textit{el însuşi})} = \frac{\mathrm{P}(\textit{el însuşi}|\mathtt{reflexive}) * \mathrm{P}(\mathtt{reflexive})}{\mathrm{P}(\textit{el însuşi}|\mathtt{disjoint}) * \mathrm{P}(\mathtt{disjoint})}$$

$$\frac{\mathrm{P}(\mathtt{disjoint}|\textit{acesta})}{\mathrm{P}(\mathtt{reflexive}|\textit{acesta})} = \frac{\mathrm{P}(\textit{acesta}|\mathtt{disjoint}) * \mathrm{P}(\mathtt{disjoint})}{\mathrm{P}(\textit{acesta}|\mathtt{reflexive}) * \mathrm{P}(\mathtt{reflexive})}$$

Note that we cannot use the production probabilities directly to calculate this ratio, because we never observed any instances of *el însuşi* in the disjoint condition (i.e. *P(el însuşi | disjoint) = 0*). Let us suppose for the sake of argument, then, that the

probability of using *el însuşi* in a disjoint context is as high as the probability of using *acesta* in a reflexive context. That is, we might take *P(el însuşi | disjoint) = 0.00125* as an upper bound on this subjective probability.

(143) *Bayes Factors*

$$\frac{\mathrm{P}(\mathtt{reflexive}|\textit{el însuşi})}{\mathrm{P}(\mathtt{disjoint}|\textit{el însuşi})} = \frac{0.4177 * \mathrm{P}(\mathtt{reflexive})}{0.00125 * \mathrm{P}(\mathtt{disjoint})}$$

$$\frac{\mathrm{P}(\mathtt{disjoint}|\textit{acesta})}{\mathrm{P}(\mathtt{reflexive}|\textit{acesta})} = \frac{0.0835 * \mathrm{P}(\mathtt{disjoint})}{0.00125 * \mathrm{P}(\mathtt{reflexive})}$$

If we further assume that the prior probabilities on each interpretation are the same, then these Bayes Factor ratios reduce to the ratio of the production probabilities. This means that if a listener hears *acesta* in contexts like those we study here, and uses implicit knowledge of production probabilities to derive an interpretation of the pronoun, there is 66.8 to 1 odds that the intended interpretation is disjoint. That is a very strong, but by no means categorical preference for the disjoint interpretation. In contrast, *el însuşi* is a significantly stronger cue: the Bayes Factor in favor of the reflexive interpretation, given *el însuşi*, is 334.16. The odds of a reflexive interpretation given *el însuşi* are 334.16 to 1, which is potentially an underestimate of the true odds in favor of a reflexive interpretation.

We should remain somewhat skeptical of the precise values given here, given the uncertainty in how they were estimated. Still, we can characterize this result simply as: from the production data, we expect *el însuşi* to be a much stronger cue to reflexive interpretations than *acesta* is to disjoint interpretations. In other words, *el însuşi* has higher cue validity for reflexive readings, in the sense of Beach (1964), than does *acesta* for disjoint reference.

We can leverage these differences in cue validities to test whether there is an

implicit competition process during the interpretation of ambiguous regular pronouns. One way to test this is by factorially manipulating the availability of different referring expressions across contexts. We can do this by setting up two groups of participants: a *Form* group, and a *Gender* group. In the *Form* group, we will make salient both the emphatic reflexive and the demonstrative forms. Recall again that these forms differ substantially in their cue validity: *el însuşi* is very strongly associated with reflexive interpretations, while *acesta* is less strongly associated with disjoint interpretations.

The two comprehension experiments investigate the interpretation of regular pronouns for both *referential (Experiment 3)* and *quantified subject antecedents (Experiment 4)*. The COMPETITION factor is controlled for in a between-subject design, whereby participants are randomly assigned to two different groups. In this sense, the COMPETITION factor targets pronominal interpretation in two different situations: (i) one where the speaker disregards BE CLEAR! and only obeys BE SMALL! and (ii) a situation where the speaker is mostly cooperative, and obeys BE CLEAR! in two thirds of the critical items. In both situations, a third of the critical items include regular pronouns ambiguous between a reflexive and disjoint reading. In the first case, which corresponds to the *Gender* group of subjects, and in which, according to BE SMALL!, only regular pronouns are used, comprehenders may only rely on gender information to identify the referent in the unambiguous items. In the second situation, which corresponds to the *Form* group, and in which the experimental items also include emphatic reflexives and demonstratives, comprehenders may only disambiguate between the two readings by means of the pronominal form: emphatic reflexives give rise to reflexive readings, demonstratives give rise to disjoint reference readings, and regular pronouns are ambiguous.

If emphatic reflexives do not compete with regular pronouns, as argued by Safir (2004) and Rooryck & vanden Wyngaerd (2011), then we expect no difference

in the rate of reflexive interpretation of regular pronouns between the two participant groups, *Gender* and *Form*. However, under the hypothesis that there is a tacit competition process between these forms in comprehension, listeners in the *Form* group should be aware that there is a highly available, highly valid cue for reflexive interpretation that the speaker is using, namely *el însuşi*, but only a moderately valid cue for disjoint interpretations, *acesta*. On balance, this should bias listeners towards a disjoint interpretation of *el* in the *Form* group: had the speaker intended a reflexive interpretation, they would have used the form with very high cue validity for that interpretation, *el însuşi*. While making *acesta* highly available might plausibly exert a countervailing effect, biasing listeners towards reflexive interpretations, it is a less potent cue for disjoint reference, as evinced by the production data probability estimates. For this reason, if we assume that the strength of a cue moderates its influence in the competition — available competitors with high cue validity compete more strongly for a given interpretation — then on balance, by making the *el însuşi* forms highly available in the experimental context for the Form group should bias listeners to interpret an ambiguous *el* as disjoint in reference with the local subject.

4.3 Experiment 3: Referential Subjects

4.3.1 Participants

Sixty-eight participants (62 female) were recruited from the University of Bucharest undergraduate community in exchange for monetary compensation (30 RON - roughly $8 USD). All participants were native speakers of Romanian and gave informed written consent for the use of their data. For the sake of comparing production and comprehension in the same syntactic and discourse context, half of the participants (34 total) were recruited from the population which took part in

the production study in *Experiment 1*. The age range was between 18 and 30, with a mean of 20.35. No participants were excluded from the analysis.

4.3.2 Materials & Design

The experiment is a sentence comprehension task with a 2 x 3 factorial design (GROUP X AMBIGUITY). Participants were presented with a sentence, auditorily, and were asked to choose one of two pictures displayed on the screen, based on their preferred interpretation for the sentence they heard. The AMBIGUITY factor concerns the possible interpretations of the target sentences: whether the sentence is *Ambiguous* between a reflexive and a disjoint reading, whether it is necessarily *Reflexive* or whether it is necessarily *Disjoint*, given the two pictures presented on the screen. The GROUP factor, which is between subjects, manipulates how sentences were disambiguated, which by hypothesis affects the competition between the different pronominal forms: the *Gender* group of subjects only heard sentences with the regular pronouns *el* 'him', *ea* 'her', while the *Form* group were exposed to sentences with regular pronouns, demonstratives, and emphatic reflexives. In this experiment, all items featured a referential subject, like *Anca*.

15 experimental items were constructed. Each item involved a target sentence and two target pictures. In order to compare the production and comprehension experiments, the comprehension stimuli were compiled based on those for *Experiment 1*, the production study. Each target picture and sentence set was preceded by a short context to introduce the relevant discourse referents, alongside their portraits, in a random order. Then, after the context disappeared from the screen, participants heard the target sentence while also being presented with two target pictures. The target sentence is only given auditorily: participants cannot see the target sentence written on the screen. An example of an entire trial, including the context screen, is given in (144) below.

(144) a. **Context Screen**:

Acesta este Andrei.

this is Andrei

'This is Andrei.'

Acesta este Mihai.

this is Mihai

'This is Mihai.'

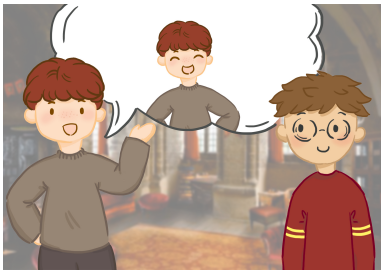
b. **Target sentence (presented auditorily):**

Acasă la Mihai, Andrei a vorbit despre el.

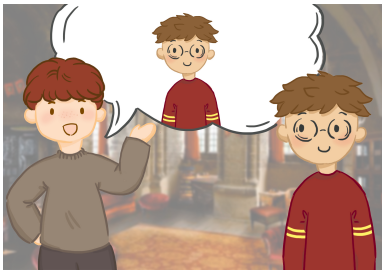
home at Mihai, Andrei has talked about him.

'At Mihai's house, Andrei talked about him(self). '

c. **Target Screen**:



D



K

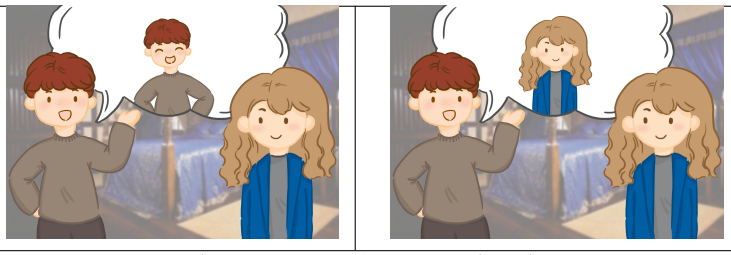
Each target sentence consists of a topic prepositional phrase (PP) which names one of the referents (*at X's party, in X's garden*) introduced in the short context, an overt subject which refers to the other antecedent by name, and a predicate which takes a PP object (*laugh at, cook for*) and is equally plausible with a reflexive and non-reflexive continuation. Eight of the predicates used in the 15 items were communication verbs (*talk, chatter, narrate*, etc.) The rest are translated as follows: *lie about, cook for, joke about, dream about, think about, read about, laugh at*. No transitive verbs were used to avoid clitic doubling.

As in *Experiment 1*, the production counterpart of this study, participants saw a total of eight characters: 4 male and 4 female. For each of the 15 experimental items 5 conditions were constructed, arranged in a 2 x 3 design crossing GROUP (*Gender/ Form*), the between subjects factor, with AMBIGUITY (*Reflexive/Disjoint/Ambiguous*), the within subjects factor. All conditions included two pictures differing solely in the target of the speech/thought bubble: one where the character in the thought bubble is the local subject, and one where the thought bubble targets the referent introduced in the topic PP. The AMBIGUITY factor manipulated the intended interpretation of the target sentence, which was either unambiguously *Reflexive*, unambiguously *Disjoint* from the local subject, or *Ambiguous* between the two readings.

As shown in *Table 4.8*, each condition is associated with a different target sentence. The GROUP factor is a between subjects manipulation: participants were randomly assigned to either the *Gender* group or the *Form* group. The target sentence and pictures for the *Ambiguous* condition were identical across the two participant groups, with matching gender for the two characters and regular pronoun in the target sentence. For the *Gender* group, the characters in the unambiguous condtions always mismatch in gender: one male and one female. In this sense, the grammatical gender on the regular pronoun *el / ea* 'him / her' suffices to disambiguate between a reflexive and a disjoint reading. For the *Form* group, the characters match in gender across the three conditions; in this case, the grammatical gender of the pronoun is not sufficient to decide between an interpretation for the unambiguous conditions, and participants can only rely on the pronoun type: either emphatic reflexive *el însuşi* 'him himself' or demonstrative *acesta* 'this one'. *Table 4.8* illustrates this contrast for the item in (113). The pre-critical context screen introduced the two referents in each sentence in a random order. For each item, the speaker remained the same across the five conditions. The gender of the speaker was counterbalanced across the items: 7 items with male speakers, 8 items with fe-

male speakers. The referent pairs were also balanced: each of the eight characters served as the speaker only for two items at most, and their partners were different in each item.

The items were distributed in six Latin Squared Lists for each of the two groups and interspersed with 15 fillers, which were all grammatical and similar to the critical items in terms of structural complexity. In order to mimic the ambiguity manipulation in the experimental items, the fillers differed in semantic complexity. 8 of the fillers only introduced one discourse referent in the preceding context, and the target sentence was only compatible with one of the two target pictures. Seven fillers were associated with two character contexts, and the referring expression (e.g. *this boy, this girl, this person, one of them*) in the target sentence was ambiguous between the two characters. All of the fillers referenced objects or abstract concepts in the speech/thought bubble, disallowing a reflexive interpretation. Thus, each participant would be exposed to at most 10 reflexive scenarios, including the ambiguous sentences (out of a total of 30 sentences). 7 out of 15 fillers were subject-initial and did not include a topicalized PP. I also constructed 5 more items modeled after (but distinct from) the experimental items: 3 practice items and two items used in the Instructions. The items used in the Instructions simulated a *Reflexive* condition: for the *Gender* group, the two characters mismatched in gender and the target sentence included the personal pronoun *el*, while for the *Form* group, the two characters matched in gender and the target sentence included the emphatic reflexive *el însuşi*. The three practice items were modeled after a *Disjoint* condition (personal pronoun for *Gender* group and demonstrative for *Form* group), and a single antecedent filler item, respectively. The Instructions and practice items did not repeat any of the 15 critical items or any of the 15 fillers. The full list of items, fillers and practice items is given in the Appendix.

Gender Group	Gender Unambiguous
	
Disjoint (Fem. Pronoun)	*Acasă la <u>Irina</u>,* ***Andrei*** *a vorbit despre <u>ea.</u>* home at Irina, Andrei has talked about her 'At Irina's house, Andrei talked about her´
Reflexive (Masc. Pronoun)	*Acasă la <u>Irina</u>,* ***Andrei*** *a vorbit despre* ***el*** home at Irina, Andrei has talked about him 'At Irina's house, Andrei talked about him.´

Gender & Form Group	Ambiguous
	
Ambiguous (Masc. Pronoun)	*Acasă la* ***Mihai,*** ***Andrei*** *a vorbit despre* el. home at Mihai, Andrei has talked about him 'At Mihai's house, Andrei talked about him.'

Form Group	Form Unambiguous
	
Disjoint (Demonstrative)	*Acasă la* ***Mihai,*** ***Andrei*** *a vorbit despre* ***acesta.*** home at Mihai, Andrei has talked about this one 'At Mihai's house, Andrei talked about this one´
Reflexive (Emphatic Refl.)	*Acasă la* ***Mihai,*** ***Andrei*** *a vorbit despre* ***el însuşi*** home at Mihai, Andrei has talked about him himself 'At Mihai's house, Andrei talked about himself.'

Table 4.8: Sample Item Pictures & Target Sentences by Condition for Experiment 3. Female character names are underlined, male character names are in bold.

4.3.3 Procedure

The experiment took place at the Faculty of Foreign Languages and Literatures (*Facultatea de Limbi şi Literaturi Străine* - FLLS) of the University of Bucharest[6]. Participants were recruited through flyers, class announcements and on the online platform of FLLS. Half of the participants for this experiment were recruited via email, by reaching out to undergraduate students who also took part in *Experiment 1*, the production task. The repeated participants were evenly distributed across the two groups and six Latin Square lists.

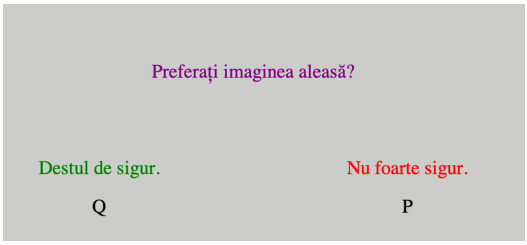
The experiment was coded in *PsychoPy* on a 2013 *Macbook Air* and run on the same laptop. After giving informed consent, participants' eye movements were also recorded by means of the *Macbook*'s webcam. Participants were walked through the instructions in PsychoPy and told that their task is to identify the topic of conversation or contemplation as described in the target sentence they heard, and choose the picture (one of two) that best matched their interpretation of the sentence. Participants were encouraged to trust their native speaker intuitions and not spend too much time on any given item.

For each item, the context introducing the relevant discourse referents (alongside their portraits) was coded to remain on the screen for 8 seconds; the context screen was followed by a one second break (blank screen) after which participants heard the target sentence and were immediately shown the two target pictures. Participants were instructed to examine the target pictures before choosing an interpretation, and encouraged to choose their preferred reading, even though both pictures might be compatible with the sentence. Participants were instructed to press D if they preferred the image on the left, and K if they preferred the image on the right. The keys associated with each picture were always listed under-

[6]I thank Octavian Roske and the American Studies division of the English department of FLLS for allowing us to run the entire experiment in one of their offices.

neath the item pictures. The target picture would continue to be displayed on the screen until the participant had made a decision. Finally, participants were asked to evaluate whether they had a strong preference for the picture they had chosen. If they strongly prefered an interpretation, they were asked to press Q; by pressing P they indicated that they only had a slight preference for the chosen image. The confidence assessment screen, which followed each picture choice, is given below, alongside its English translation.

(145) **Confidence Screen**



Do you prefer the image you chose?

Pretty sure. Not very sure.

Q P

After the instructions, participants would go through two practice items, 30 items (experimental and filler), 4 exit poll items, and, finally, an exit interview with the experimenter. The entire process lasted, on average, around 45 minutes for each participant, 15-20 minutes of which were taken up by the experiment itself.

4.3.4 Analysis

Participant responses were collected via the *PsychoPy* software. No participants or items were excluded from the analysis. For the reaction time (RT) data, response RTs measure the interval between the onset of the pronoun in the target sentence and the keypress signaling a choice of interpretation. Observations with RTs larger than 20 seconds were excluded from the analysis. Furthermore, RTs which exceeded 3 standard deviations from the average RT (by condition) were excluded from the analysis; this cutoff led to the exclusion of 2.25% of the data.

	Group Coding	
	Form	*Gender*
COMPETITION	**1**	**0**

	Condition Coding		
	Ambiguous	*Reflexive*	*Disjoint*
DISJOINT READING	**0**	**1**	**0**
REFLEXIVE READING	**0**	**0**	**1**

	Interpretation Coding	
	Reflexive	*Disjoint*
INTERPRETATION	**-0.5**	**0.5**

Table 4.9: Contrast Coding for Experiment 3.

Consequentlly, out of the total of 1020 observations, data analysis was performed on 997 observations.

I fitted a nested logistic mixed effects regression model to estimate the effect of COMPETITION (between participant group differences) within each level of the AMBIGUITY factor (*Ambiguous, Reflexive, Disjoint*), with *Reflexive Interpretation* as the dependent variable, and CONDITION/COMPETITION as the fixed effect, and *Item and Subject* as random effects. In order to determine whether the rate of reflexive interpretation in the *Reflexive* and *Disjoint* conditions differs significantly from the *Ambiguous* condition, the model takes the *Ambiguous* condition as the baseline, and the *Disjoint* and *Reflexive* conditions have their own treatment contrasts, as illustrated in *Table 4.9* above. Should the rate of reflexive interpretation in the *Ambiguous* condition differ from chance, the intercept will prove to be significant.

The same logistic mixed effects regression model was also fitted to determine whether there is a significant effect of COMPETITION on the *Confidence* which par-

ticipants indicated after choosing an interpretation, with *Confidence* as the dependent variable. In this case, *quite sure* regarding the choice was coded as 1, and *not so sure* as 0.

Given that the *Ambiguous* condition is the only condition where the stimulus is the same across the two participant groups, we can determine whether the presence of other pronominal forms has an effect on reaction time by analyzing the effect of COMPETITION in the *Ambiguous* condition. I fitted a nested linear mixed effects regression model to estimate the effect of COMPETITION for each interpretation (*Reflexive* or *Disjoint*) in the *Ambiguous* condition, with the log reaction time data as the dependent variable, and *Subject* and *Item* as random effects.

Lastly, given that most of the participants were female, *gender* was also added as a factor in post-hoc (logistic and linear, respectively) analyses of rate of reflexive interpretation, confidence and response time data. The gender of the participants was not significant. Item order was also added as a factor in the analyses; the were no significant order effects.

4.3.5 Results

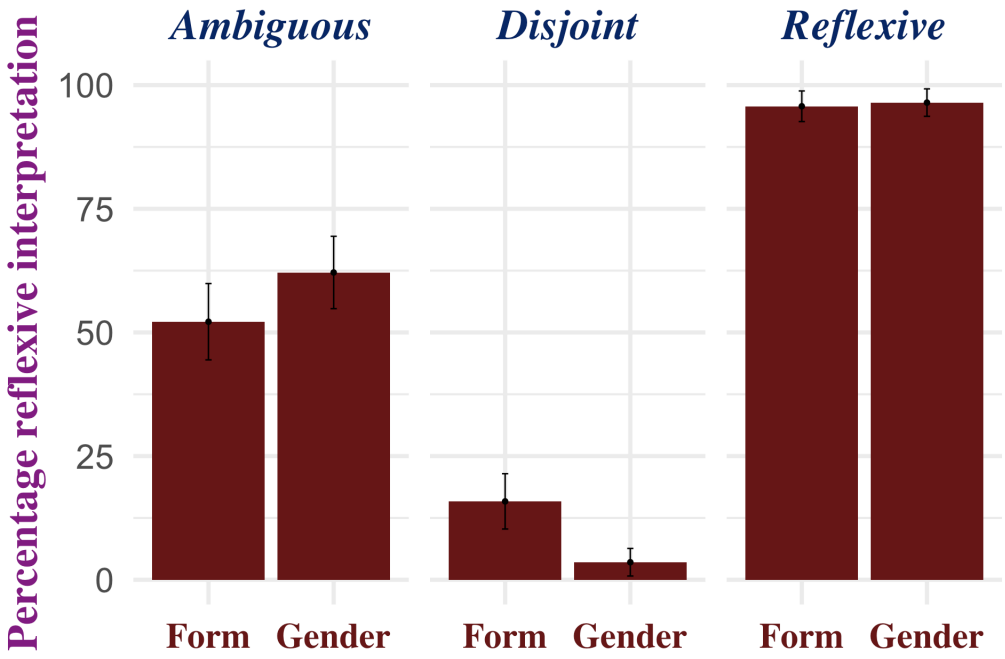
The rate of reflexive interpretation within the six conditions is given in *Table 4.10*. The highlighted column represents the rate of reflexive interpretation in the *Ambiguous* condition, which consisted of the same stimuli, both visual and auditory, across the two participant groups. A graphical representation of the rate of reflexive interpretation for each condition is given in *Figure 4.1*. The two groups did not differ significantly in the rate of reflexive interpretation for the *Ambiguous* or for the *Reflexive* condition. *Table 4.11* lists the results of the main analysis with the rate of the reflexive interpretation as the dependent variable.

The logistic mixed effects regression model revealed that the rate of reflexive interpretation in the *Reflexive* condition was significantly different ($\beta = 3.56$, $z =$

	Form		Gender	
	Rate	*Pronoun*	*Rate*	*Pronoun*
Ambiguous	52.2%	*el / ea*	62.1%	*el / ea*
Reflexive	95.7%	*el însuşi / ea însaşi*	96.5%	*el / ea*
Disjoint	15.9%	*acesta / aceasta*	3.5%	*el / ea*

Table 4.10: Rate of Reflexive Interpretation by Condition in Experiment 3. Pronoun: *el / ea* - 'him / her'; *el însuşi / ea însaşi* - 'him himself / her herself'; *acesta / aceasta* -'this one.masc, this one.fem.'

Figure 4.1: Rate of Reflexive Interpretation by Condition in Experiment 3.



	Nested Model: Condition/Competition		
Condition	*Estimate*	*SE*	*z value*
Intercept: Ambiguous	**0.52**	**0.21**	**2.49***
Reflexive	**3.56**	**0.59**	**5.98*****
Disjoint	**-4.14**	**0.50**	**-8.18*****
Ambiguous/Competition	-0.42	0.245	-1.72
Reflexive/Competition	0.46	0.92	0.50
Disjoint/Competition	**1.59**	**0.57**	**2.79****

Table 4.11: Logistic Mixed Effects Model Estimates for the effect of Competition on the rate of Reflexive Interpretation in Experiment 3.
All significant effects are bolded. Legend: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

CONDITION	AMBIGUOUS		REFLEXIVE		DISJOINT	
	Form	*Gender*	*Form*	*Gender*	*Form*	*Gender*
MEAN RT	4.88	4.14	3.83	2.7	4.52	2.74
MEDIAN RT	3.95	3.7	3.19	2.35	3.78	2.3
SD RT	2.66	1.94	2.24	1.57	1.84	1.35
OBSERVATIONS	161	169	164	170	164	169

Table 4.12: Mean, Median and Standard Deviation Reaction Time (in seconds) by condition in Experiment 3.

INTERPRETATION	REFLEXIVE		DISJOINT	
	Form	*Gender*	*Form*	*Gender*
MEAN RT	4.92	4.00	4.83	4.37
MEDIAN RT	3.79	3.39	4.14	3.90
STANDARD DEVIATION RT	2.97	1.99	2.28	1.83
OBSERVATIONS	84	105	77	64

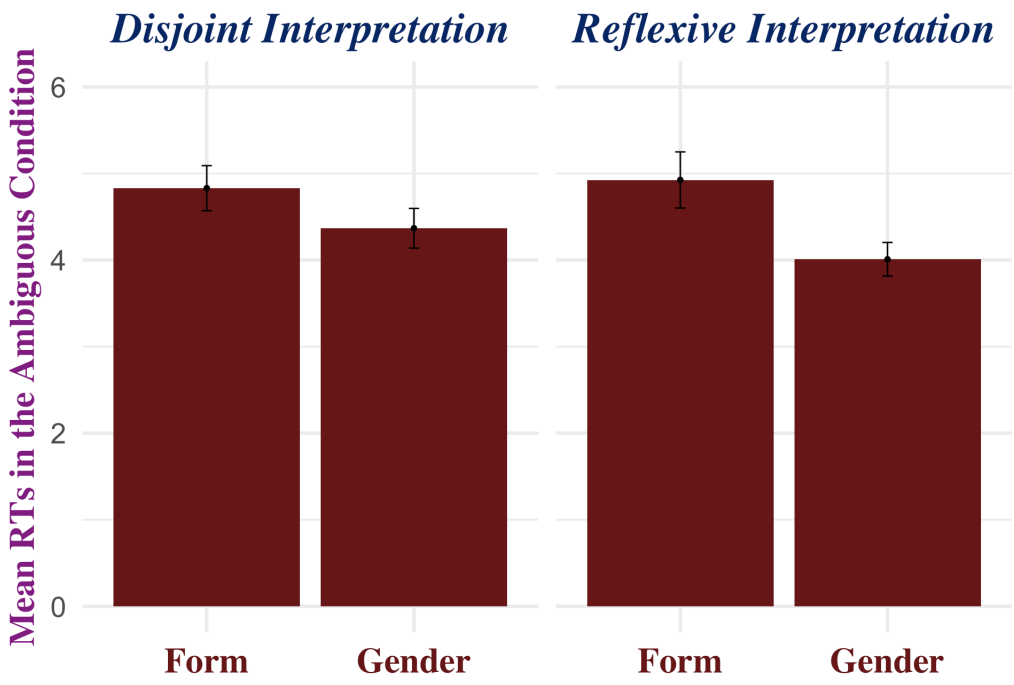
Table 4.13: Mean, Median and Standard Deviation Reaction Time (in seconds) in the Ambiguous Condition by Interpretation in Experiment 3.

5.98, SE = 0.59, p <0.001) from the rate of reflexive interpretation in the *Ambiguous* condition, and that, similarly the rate of reflexive interpretation in the *Disjoint* conditon was significantly different (β = -4.14, z = -8.18, SE = 0.50, p <0.001) from the *Ambiguous* condition. The model also revealed that the rate of reflexive interpretation in the *Ambiguous* condition, which was the intercept, was significantly different from chance (β = 0.52, z = 2.49, SE = 0.21, p = 0.05).

Furthermore, the model revealed no significant effect of COMPETITION in the *Ambiguous* ($p = 0.085$) or in the *Reflexive* ($p = 0.62$) conditions. A significant effect of COMPETITION was registered in the *Disjoint* condition (β = 1.59, z = 2.79, SE = 0.57, $p < 0.01$).

The mean, median and standard deviation reaction time (RT) data within the six conditions is given in Table 4.12. For the *Ambiguous* condition, which was constant across the two participant groups, the RT data for each interpretation (*Reflex-*

Figure 4.2: Mean Reaction Time in the Ambiguous Condition by Interpretation Type in Experiment 3.



ive or *Disjoint*) is listed in *Table 4.13*. A graphical representation of the RTs for the *Ambiguous* condition by interpretation can be found in *Figure 4.2*. The two groups did not differ significantly in terms of RT when interpreting the *Ambiguous* condition as *Disjoint*. However, as suggested by the descriptive data, participants in the *Gender* group were faster than the *Form* group when choosing a *Reflexive* interpretation for the ambiguous stimuli; the statistical analysis confirms this finding. For the analysis, the RTs were log transformed. *Table 4.14* lists the results of the linear model with log RT as the dependent variable.

The nested linear model indicates that while COMPETITION had no significant effect on the reaction time of participants choosing a *Disjoint* interpretation for an *Ambiguous* item, there was a significant difference in terms of RTs between the two participant groups when choosing a *Reflexive* interpretation for an *Ambiguous* stimulus (*Reflexive Interepretation/Competition*: $\beta = 0.2$, $t = 2.02$, $SE = 0.1$, $p < 0.05$).

	Nested Model: Interpretation/Competition		
Factor	*Estimate*	*SE*	*t value*
REFLEXIVE INTERPRETATION	**-0.145**	**0.065**	**-2.221***
DISJOINT INT./COMPETITION	0.05	0.106	0.488
REFLEXIVE INT./COMPETITION	**0.20**	**0.10**	**2.02***

Table 4.14: Linear Mixed Effects Model Estimates for the effect of Competition on Log Reaction Time in Experiment 3. All significant effects are bolded.
Legend: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

CONDITION	AMBIGUOUS		REFLEXIVE		DISJOINT	
	Form	*Gender*	*Form*	*Gender*	*Form*	*Gender*
MEAN CONFIDENCE	62.11%	57.99%	97.56%	90.59%	75%	89.9%
SD CONFIDENCE	3.82	3.79	1.2	2.24	3.38	2.31
OBSERVATIONS	161	169	164	170	164	169

Table 4.15: Mean and Standard Deviation Confidence Rate by condition in Experiment 3.

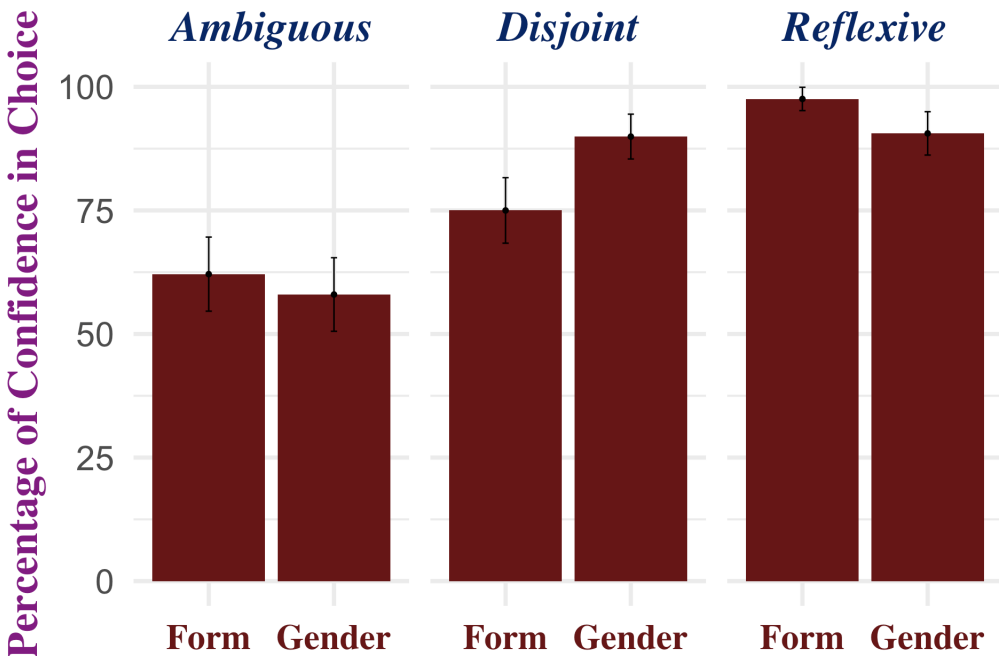
Furthermore, there was a significant effect of *Reflexive Interpretation* (β = -0.145, t = -2.22, SE = 0.065, $p < 0.05$)): participants were overall faster when interpreting an ambiguous sentence as *Reflexive* than when choosing the *Disjoint* reading.

Lastly, a mixed effects logistic regression analysis was conducted on the confidence of participants' interpretation choices. The confidence rate for all six conditions is given in *Table 4.15*. A graphical representation of these confidence rates across the six conditions can be found in *Figure 4.2*. For the *Ambiguous* condition,

INTERPRETATION	REFLEXIVE		DISJOINT	
	Form	*Gender*	*Form*	*Gender*
MEAN CONFIDENCE	60.7%	55.2%	63.6%	62.5%
SD CONFIDENCE	4.91	5	4.84	4.88
OBSERVATIONS	84	105	77	64

Table 4.16: Mean and Standard Deviation Confidence Rate in the *Ambiguous* Condition by Interpretation in Experiment 3

Figure 4.3: Rate of Confidence by Condition in Experiment 3.



the confidence level for each interpretation (*Reflexive* or *Disjoint*) is listed in *Table 4.16*. The two participant groups did not differ significantly for either interpretation in the *Ambiguous* condition. However, as suggested by the descriptive data, participants in the *Form* group were less confident than those in the *Gender* group when interpreting the stimuli in the *Disjoint* condition, and, as expected, participants were overall less confident in the *Ambiguous* conditions than in the other four. *Table 4.17* lists the results of the model with confidence metrics as the dependent variable.

The model confirms that the confidence of a chosen interpretation is significantly affected by the AMBIGUITY factor: the *Reflexive* and *Disjoint* conditions show reliable effects (*Reflexive*: $z = 6.00$, $SE = 0.54$, $p < 0.001$, *Disjoint*: $z = 6.15$, $SE = 0.49$, $p < 0.001$). The nested model does not reveal a significant effect of COMPETITION within all levels of the AMBIGUITY factor. The only significant nested contrast, as also illustrated in *Figure 4.3*, is that between COMPETITION and the *Disjoint* condi-

	Nested Model: Condition/Competition		
Condition	*Estimate*	*SE*	*z value*
INTERCEPT: AMBIGUOUS	0.486	0.30	1.58
REFLEXIVE	**3.23**	**0.54**	**6.00*** **
DISJOINT	**3.06**	**0.49**	**6.15*** **
AMBIGUOUS/COMPETITION	0.274	0.44	0.62
REFLEXIVE/COMPETITION	6.49	4.54	1.43
DISJOINT/COMPETITION	**-1.71**	**0.68**	**-2.5***

Table 4.17: Logistic Mixed Effects Model Estimates for the effect of Competition on the Confidence Rate of Interpretation in Experiment 3.
All significant effects are bolded. Legend: * p $<$ 0.05, ** p $<$ 0.01, *** p $<$0.001.

tion (z = -1.71, SE = 0.68, $p < 0.05$).

4.3.6 Discussion

With respect to the overall interpretation of ambiguous pronouns across the two participant groups, there were three main alternatives considered at the outset of this experiment: (i) *Binding is Easy*, which predicted that comprehenders would exhibit a preference towards bound variable LFs, hence, reflexive interpretations; (ii) *Pragmatic Listeners*, which predicted an overall preference for disjoint readings; and (iii) *Probabilistic Inferencing*, according to which, based on the production data discussed in *Chapter 3*, participants were predicted to choose a reflexive interpretation between 47.7% and 67.2% of the time. According to the comprehension data collected in this study, the overall rate of reflexive interpretation across the two participant groups was 57.15%. These results align with the prediction regarding the overall data of the Bayesian Model adopted in the *Probabilistic Inferencing* hypothesis, but are not expected under the *Pragmatic Listeners* hypotheses.

The mixed effects logistic regression model revealed that comprehenders choose *reflexive* interpretations for ambiguous pronouns at a rate greater than chance rate (which corresponds to 57.15%), which is compatible with the *Binding is Easy* hypothesis, but this is a slight preference, and by no means as strong as in the Wagers

et al. (2018) Chamorro study (88%). Furthermore, the logistic mixed effects regression analysis modeling the confidence of participants' choices revealed a significant effect of AMBIGUITY, with participants being significantly (p<0.001) more confident in the *Reflexive* and *Disjoint* conditions than in the *Ambiguous* condition. Had the reflexive interpretation of the ambiguous pronouns been 'virtually by default', as in the Wagers et al. (2018) study, the expectation would have been that participants would have been more confident in choosing a reflexive interpretation for the ambiguous condition. However, the mean confidence for reflexive readings in the *Ambiguous* condition is at chance level (55.2-60.7%), and does not greatly differ from the mean confidence for disjoint readings in the same condition (62.5-63.6%).

A secondary finding from the comprehension experiment with referential subjects is that there was no clear effect of COMPETITION for the *Ambiguous* stimuli ($p > 0.05$) for any of the relevant dependent variables: rate of reflexive interpretation or confidence ratings. Descriptively, there was a 9.9% difference in the rate of reflexive interpretation, participants in the *Form* group having chosen a reflexive reading more often than those in the *Gender* group. Given the low power of the experiment (34 participants in each group, with 170 observations in each *Ambiguous* condition), this difference might prove to be significant in a larger study, which would confirm that the activation of specialized pronominal forms for reflexive readings leads to fewer reflexive interpretations of ambiguous pronouns.

The analysis on the rate of reflexive interpretation reveals that the only significant effect of COMPETITION on the rate of reflexive interpretation was found for the *Disjoint* condition ($p < 0.01$). As illustrated in *Figure 4.1* and *Table 4.10*, participants assigned a reflexive reading to the items in the *Disjoint* condition in the *Form* group 15.9% of the time, whereas participants in the *Gender* group only did so for 3.5% of the stimuli. For the *Gender* group, this interpretation is implausible given the gender mismatch between the sentence subject and the target pronoun.

For the *Form* group, where demonstrative pronouns were used instead of regular pronouns, the higher rate of reflexive interpretation signals that participants are not consistently applying Condition B for demonstratives. In other words, while there is a strong preference to interpret *acesta / aceasta* 'this one' as disjoint from the sentence subject, a reflexive interpretation is still plausible for some speakers.

In terms of RTs, there was a significant effect of COMPETITION ($p < 0.05$) in the *Ambiguous* condition when participants interpreted these stimuli as reflexive. As illustrated in *Figure 4.2*, participants in the *Gender* group were faster to assign a reflexive reading to an ambiguous item than participants in the *Form* group. This effect is evidence that the activation of specialized reflexive forms, i.e. the emphatic reflexive, significantly affects the processing of regular pronouns. Furthermore, for the *Ambiguous* condition, there was also an overall effect of *Reflexive Interpretation* ($p < 0.05$): across the two groups, participants were faster to assign a reflexive reading than a disjoint one. In corroboration with the data from the production experiments, where the rate of regular pronouns in *Reflexive* conditions was higher than the rate of these pronouns in the *Disjoint* conditions, this effect suggests that there is a slight preference for Romanian regular pronouns to express reflexivity, rather than disjoint reference.

With respect to the confidence ratings, there was an expected main effect of the *Ambiguous* condition ($p < 0.001$): across the two groups, participants were less confident in their chosen interpretation for the *Ambiguous* (60.05% on average) conditions than for the *Reflexive* (94.07% on average) or *Disjoint* conditions (82.45% on average). While COMPETITION had no effect on the confidence ratings for the *Reflexive* or *Ambiguous* conditions, there was an effect of COMPETITION at the level of the *Disjoint* condition ($p < 0.01$): participants in the *Form* group were less confident than participants in the *Gender* group (by a 14.9% difference). Furthermore, while the confidence rating for the emphatic reflexive was at 97.56%, the highest

confidence rating out of all 6 conditions, the confidence rating for demonstrative pronouns was at 75%. This again suggests that Romanian speakers are less confident in the interpretation of demonstrative pronouns, and that *acesta / aceasta* was not consistently interpreted as *disjoint* in reference from the local subject.

4.4 Experiment 4: Quantified Subjects

4.4.1 Participants

Sixty-eight participants (63 female) were recruited from the University of Bucharest undergraduate community in exchange for compensation (30 RON - roughly $8 USD). All participants were native speakers of Romanian and gave informed written consent for the use of their data. For the sake of comparing the two comprehension experiments, twenty of them were recruited from the population which took part in *Experiment 3*, the comprehension task targeting referential syntactic subjects. Of the pool of 68 participants, 33 had never participated in an experiment before, 15 took part in the first production experiment, 10 took part in first comprehension experiment, and 10 took part in both *Experiment 1* and *Experiment 3*. Their age range was between 18 and 30, with a mean of 20.52. No participants were excluded from the analysis.

4.4.2 Materials & Design

The experiment consisted of a sentence comprehension task, along the lines of *Experiment 3*, the main difference being that all sentence subjects in *Experiment 4* are *quantificational*. The task had a 2 x 3 factorial design (GROUP X INTENDED READING), with GROUP being a between subjects factor, while *Intended Reading* is within subjects. Due to having collected the data for *Experiment 2* and *Experiment 4* less than a month apart, there was no overlap between participants for the production

and comprehension studies with quantified subjects.

15 experimental items were constructed. Each item involved a target sentence and two target pictures. In order to compare the production and comprehension experiments, the comprehension stimuli were compiled based on those for *Experiment 2*, the production study. Each target picture and sentence set was preceded by a two-sentence context to introduce the relevant discourse referents. The first sentence in the context always gives the name of one discourse referent and sets the location for the event; the second sentence presents the other three referents and their connection to the context. Then, after the context disappears from the screen, the participants hear the target sentence while aso being presented with two target pictures. The target sentence is only presented auditorily: participants cannot see the target sentence written on the screen. An example of an entire trial, including the context screen, is given in (146).

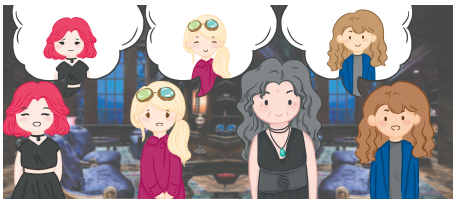
(146) a. **Context Screen**:

Bunica Laura a fost vizitată recent de către familie. Monica,
grandma Laura has been visited recently by family Monica
Elena şi Irina au fost şi ele prezente.
Elena, and Irina have been and them present
'Grandma Laura was recently visited by his family. Monica, Elena and Irina were present too.'

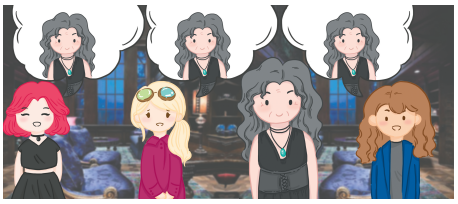
b. **Target sentence (presented auditorily):**

Acasă la bunica Laura, fiecare fată a vorbit despre ea.
home at grandma Laura, every girl has talked about her
'At Grandma Laura's house, every girl talked about her(self). '

c. **Target Screen**:



D



K

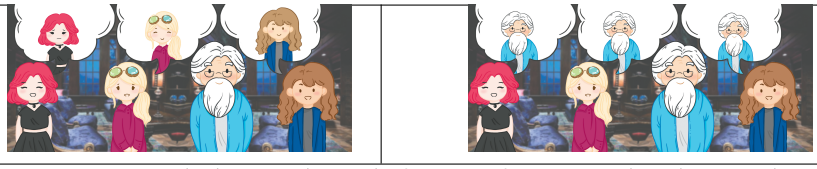
Each target sentence consists of a topic prepositional phrase (PP) which names one of the referents (*at X's party, in X's garden*) introduced in the short context, an overt subject, and a predicate which takes a PP object (*laugh at, cook for*) and is equally plausible with a reflexive and non-reflexive continuation. The sentence subjects (and agents of the event) are always a set of three discourse referents which match in gender and age (3 boys *or* 3 girls), all of which were named in the preceding context. The fourth referent is an older relative. The subject is a quantified DP which targets the three young agents of the event (*every boy/girl*). The topic PP always referred to the older relative by name (*at Aunt Diana's house*, *in Grandpa Paul's library*). Otherwise, the items across the two comprehension experiments, *Experiment 3* and *Experiment 4*, are the same.

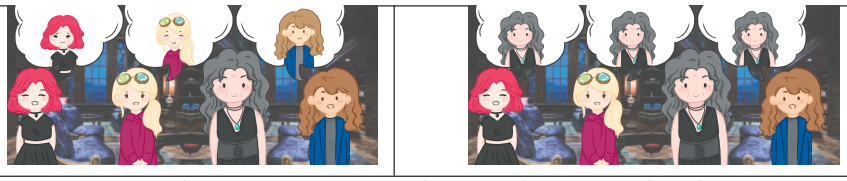
The experiment revolved around eight older characters (2 grandmas, 2 grandpas, 2 aunts, 2 uncles) and six younger characters (3 boys and 3 girls). All of these characters and their accompanying portraits were introduced individually in the Instructions. For each of the 15 items, five conditions were created by virtue of the same 2 x 3 design as in *Experiment 1*: the between subjects factor GROUP (*Gender / Form*) was crossed with AMBIGUITY (*Reflexive/Disjoint/Ambiguous*). The target pictures for each condition are illustrated in *Table 4.18*.All conditions included two pictures differring solely in the target of the speech/thought bubble: one where the character in the thought bubble is the local subject, and one where the thought bubble targets the referent introduced in the topic PP. The AMBIGUITY factor ma-

nipulated the intended interpretation of the target sentence, which was either unambiguously *Reflexive*, unambiguously *Disjoint* from the local subject, or *Ambiguous* between the two readings. The speakers are invariant across the 5 conditions. In eight of the fifteen items the agents are all female (*Monica, Elena, Irina*), while in the other seven they are all male (*Mihai, Daniel, Andrei*). The relational noun *nepot / nepoată* stands both for *nephew / niece* and *grandchild* in Romanian. Consequently, the subjects were referred to by *every boy*, *every girl*, *every nephew* and *every niece*.

The between subjects manipulation is reflected in the GROUP factor: participants were randomly assigned to either the *Gender* group or the *Form* group. Participants in the *Gender* group only heard sentences with personal pronouns, whose meaning could have been disambiguated in terms of the gender of the pronoun: *el* 'him' or *ea* 'her'. For the *Form* group, the characters matched in gender across conditions per item, and the intended interpretation of the target sentence was disambiguated by means of the pronominal form: the emphatic reflexive *el însuşi* 'him himself', the demonstrative *acesta* 'this one', and the personal pronoun *el* 'him'. The target sentence and pictures for the *Ambiguous* condition were identical across the two participant groups. An example of a single item, in all five experimental conditions, is illustrated in *Table 4.18*. The gender of the agents was counterbalanced across the items: 7 items with male agents, 8 items with female agents. As for the picture, the order of the three younger characters (and subjects of the event) matched the order in which they were introduced in the context sentence. In eight of the items, the older relative (and referent of the topic PP) was the second character depicted in the target picture. In the other half, as in (114), the older relative is the third character in the picture.

As shown in *Table 4.18*, each condition is associated with a different target sentence. For the *Gender* group, the agent characters in the unambiguous condtions always mismatch in gender with the topic PP character. In this sense, the gram-

Gender Group	Gender Unambiguous
	
Disjoint (Masc. Pron.)	*Acasă la* <u>*bunicul*</u> <u>*Paul*</u>*,* ***fiecare fată*** *a vorbit despre* <u>*el.*</u> home at grandpa Paul, every girl has talked about him 'At Grandpa Paul's house, every girl talked about him.'
Reflexive (Fem. Pron.)	*Acasă la* <u>*bunicul*</u> <u>*Paul*</u>*,* ***fiecare fată*** *a vorbit despre* ***ea.*** home at grandpa Paul, every girl has talked about her 'At Grandpa Paul's house, every girl talked about her.'

Gender & Form Group	Ambiguous
	
Ambiguous (Fem. Pron.)	*Acasă la* ***bunica Laura, fiecare fată*** *a vorbit despre* ea. home at grandma Laura, every girl has talked about her 'At grandma Laura's house, every girl talked about her.'

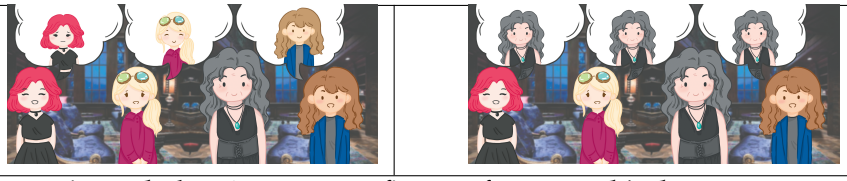
Form Group	Form Unambiguous
	
Disjoint (Dem. Pron.)	*Acasă la* ***bunica Laura, fiecare fată*** *a vorbit despre* aceasta. home at grandma Laura, every girl has talked about this.FEM 'At grandma Laura's house, every girl talked about this one.'
Reflexive (Emph. Refl.)	*Acasă la* ***bunica Laura, fiecare fată*** *a vorbit despre* ea însăşi. home at grandma Laura, every girl has talked about her herself 'At grandma Laura's house, every girl talked about herself.'

Table 4.18: Sample Item Pictures & Target Sentences by Condition for Experiment 4. Male character names are underlined, female character names are in bold.

matical gender on the pronoun *el / ea* 'him/her' suffices to disambiguate between a reflexive and a disjoint reading. In the case of the *Form* group, the characters match in gender across the three conditions; in this case, the grammatical gender of the pronoun is not sufficient to decide between an interpretation, and participants can only rely on the pronoun type: emphatic reflexive, demonstrative or personal pronoun. *Table 4.18* illustrates this contrast for the item in (113).

The items were distributed in six Latin Squared Lists (three for each of the two groups) and interspersed with 20 fillers, which were all grammatical and similar to the test items in terms of structural complexity. Due to the complexity of the items (universal quantifiers with four-character scenes), the fillers constructed were slightly more intricate than the ones in *Experiment 3*. The filler items included between 2 and 4 characters in each picture and preceding context. Thirteen of these depict three young characters which never match in gender (2 girls and one boy *or* 2 boys and one girl), unlike the experimental items where the young characters always match in gender. 10 filler items used a range of quantifiers like *some, two of the nephews*, etc. accompanied by pictures with 3 young characters. Five of the filler sentences started off with a topic PP which referenced one of the characters, similarly to the experimental items; for five of the fillers, the sentence initial topic PP did not refer to a character (e.g. *after the movie*); the other ten were subject initial. Of the latter, five fillers used sentence embedding (*One of the nephews told Uncle George that he's interested in...*). Three practice items were also constructed, and two more items which were used in the *Instructions*. The items used in the Instructions simulated a *Reflexive* condition: for the *Gender* group, the two characters mismatched in gender and the target sentence included the personal pronoun *el*, while for the *Form* group, the two characters matched in gender and the target sentence included the emphatic reflexive *el însuşi*. The three practice items were modeled after a *Disjoint* condition (personal pronoun for *Gender* group and demonstrative for *Form*

group), and a single antecedent filler item, respectively. The Instructions and practice items did not repeat any of the 15 critical items or any of the 20 fillers. The full list of items, fillers and practice items is given in the Appendix.

4.4.3 Procedure

The experiment took place at the Faculty of Foreign Languages and Literatures (FLLS) of the University of Bucharest[7] and participants were recruited through flyers, class announcements, and via the FLLS Facebook group. For *Experiment 4* which was run in April 2019, participants were also recruited from the subject pool of *Experiment 1* (October 2018) and *Experiment 3* (December 2018). Out of the 68 total participants in *Experiment 4*, 35 were repeated subjects. [8]

The experiment was coded in *PsychoPy* on a 2013 *Macbook Air* and run on the same laptop. After giving informed consent, participants' eye movements were also recorded by means of the *Macbook*'s webcam (video recordings via *QuickTime*). Participants were walked through the instructions in PsychoPy and told that their task is to identify the topic of conversation or contemplation as described in the target sentence they heard, and choose the picture (one of two) that best matched their interpretation of the sentence. The experimental procedure was identical to *Experiment 3* with the following changes.

Since *Experiment 4* involves four different discourse referents in each item, the portraits of the characters were not included on the context screen so as not to lead the participants into thinking the experiment tests their memory. Given the greater number of chracters than in *Experiment 3*, in this experiment, participants were introduced to all of the 14 characters (6 children, 8 older relatives) during

[7]We thank Alexandra Cornilescu, Larisa Avram, Anca Sevcenco, and the Linguistics division of the English department of FLLS for allowing us to run the entire experiment in one of their offices.

[8]Ideally, the repeated participants would have been from the subject pool of *Experiment 2*, the production counterpart of *Experiment 4*. However, the two experiments with quantified subjects were run only a few weeks apart; the short break between experiments would have presented a higher risk of their performance having been impacted by their previous experience.

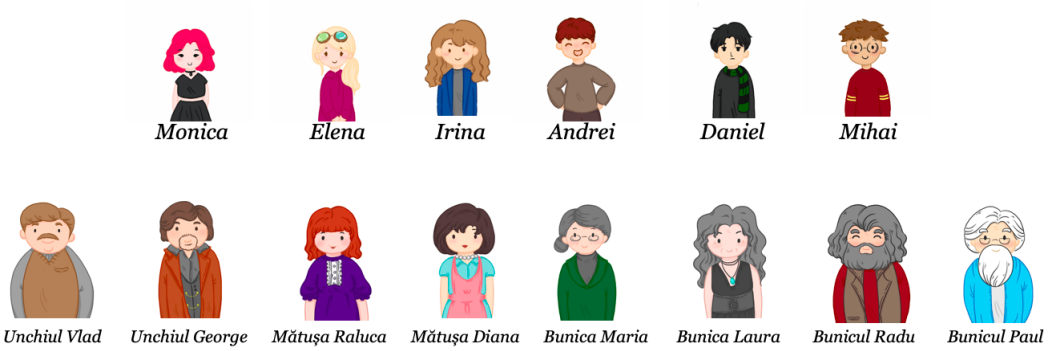
the instructions: their names and respective portraits were presented on the same screen, as in *Figure 4.4*, similarly to the production tak of *Experiment 2*. For each item, the two-sentence context introducing the relevant discourse referents was coded to remain on the center screen for 7.5 seconds. The context screen was followed by a one second break (blank screen) after which the target sentence would start to play. Unlike in the previous comprehension experiment, a 1.5 second delay was coded between the onset of the target sentence and the target pictures being displayed on the screen. This choice was made due to the more complex scenarios in *Experiment 4*. Participants were instructed to examine the target pictures before choosing an interpretation, and encouraged to choose their preferred reading, even though both pictures might be compatible with the sentence. Participants were instructed to press D if they preferred the image on the left, and K if they preferred the image on the right. The keys associated with each picture were always listed underneath the item pictures. Both the target picture and sentence would continue to be displayed on the screen until the participant had made a decision. Given the higher complexity of the items of *Experiment 4* in comparison to *Experiment 3*, in order to avoid cognitive overload, participants were no longer asked to assess how confident they were in their preference for a given reading.

After the instructions, participants would go through two practice items, 35 items (critical and filler), 4 exit poll items, and, finally, an exit interview with the experimenter. The entire process lasted, on average, around 45 minutes for each participant, 15-20 minutes of which were taken up by the task proper.

4.4.4 Analysis

Participant responses were collected via the *PsychoPy* software. No participants were excluded from the analysis. The by item rate of reflexive interpretation in the *Ambiguous* condition revealed that one item fell outside the threshold of 2 standard

Figure 4.4: Screen introducing all the Experiment 4 characters in the Instructions. Names (in order): Monica, Elena, Irina, Andrei, Daniel, Mihai, Uncle Vlad, Uncle George, Aunt Raluca, Aunt Diana, Grandma Maria, Grandma Laura, Grandpa Radu, Grandpa Paul.



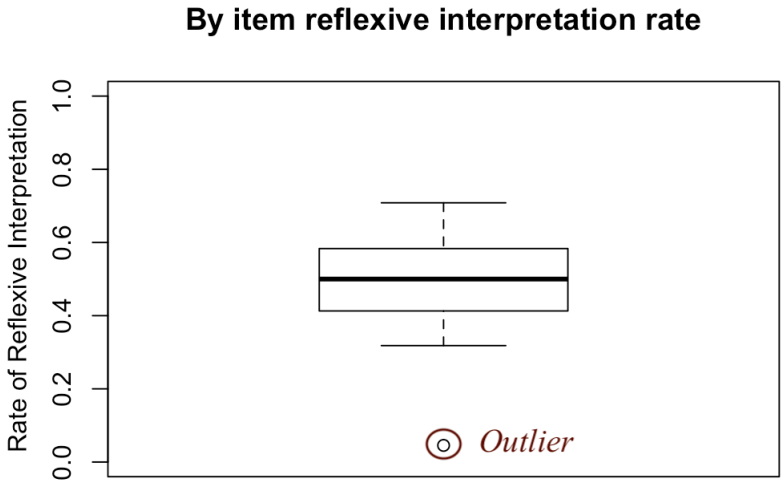
deviations from the mean, as shown in *Figure 4.5*.[9] This item was excluded from the analysis, which meant the removal of 68 observations.

For the reaction time (RT) data, response RTs measure the interval between the onset of the pronoun in the target sentence and the keypress signaling a choice of interpretation. 6 observations with RTs larger than 20 seconds were excluded. Furthermore, RTs which exceeded 3 standard deviations from the average RT (by condition) were excluded from the analysis. This cutoff led to the exclusion of 2.94% of the remaining data. In total, out of the 1020 observations collected, data analysis was performed on 924 observations.

I fitted a nested logistic mixed effects regression model to estimate the effect of COMPETITION within each level of the AMBIGUITY factor (*Ambiguous, Reflexive, Disjoint*), with *Reflexive Interpretation* as the dependent variable, and CONDITION/COMPETITION as the fixed effect, and *Item and Subject* as random effects. In order to determine whether the rate of reflexive interpretation in the *Reflexive* and *Disjoint* conditions differs significantly from the *Ambiguous* condition, the model

[9]The removed item had the following target sentence in the *Ambiguous* condition: *At Aunt Raluca's birthday, every niece laughed at her.* The rate of reflexive interpretation for this item was 0.045, while the mean rate of reflexive interpretation for the items in this condition was 0.482, with a standard deviation of 0.161.

Figure 4.5: By item rate of reflexive interpretation in *Ambiguous* condition.



	Group Coding	
	Form	*Gender*
COMPETITION	**1**	**0**

	Condition Coding		
	Ambiguous	*Reflexive*	*Disjoint*
DISJOINT READING	**0**	**0**	**1**
REFLEXIVE READING	**0**	**1**	**0**

	Interpretation Coding	
	Reflexive	*Disjoint*
INTERPRETATION	**-0.5**	**0.5**

Table 4.19: Contrast Coding for Experiment 4.

takes the *Ambiguous* condition was the baseline, and the *Disjoint* and *Reflexive* conditions have their own treatment contrasts, as illustrated in *Table 4.19* above. Unlike in *Experiment 3*, the random slopes associated with the *Reflexive* and *Disjoint* fixed effects contrasts were removed from the analysis in *Experiment 4*. The reason for this change has to do with model convergence. The rate of reflexive interpretation in the *Reflexive* condition is at ceiling (99.3-100%) in the two participant groups, which is a separation issue for the analysis, and which leads to a convergence issue in the model when the random slopes are included, rendering the *Reflexive* contrast uninterpretable.[10]

The analysis for the reaction time data is the same as in *Experiment 3*.

Like in *Experiment 3*, participant gender was also added as a factor in post-hoc secondary analyses of rate of reflexive interpretation and RT data, in the respective logistic and linear models. The gender of the participants was not significant. Item order was also added as a factor in the analyses; the were no significant order effects.

4.4.5 Results

The rate of reflexive interpretation within the six conditions is given in Table 4.20. The highlighted column represents the rate of reflexive interpretation in the *Ambiguous* condition, which consisted of the same stimuli, both visual and auditory, across the two participant groups. A graphical representation of this data is given

[10]Here are the two generalized linear model analyses in *Experiment 3* and *Experiment 4*, for comparison:

(i) *Main Analyses*

a. *Experiment 3*: analysis includes random slopes
Reflexive ~ Condition/Competition + (0+Disjoint.Reading||subject)+ (0+Reflexive.Reading||subject) + (1|subject) + (1+Disjoint.Reading*Reflexive.Reading*Competition||Item)

b. *Experiment 4*: analysis idoes not include random slopes
Reflexive ~ Condition/Competition + (1|subject) + (1+Competition||Item)

	FORM		GENDER	
	Rate	*Pronoun*	*Rate*	*Pronoun*
AMBIGUOUS	42%	*el / ea*	59.5%	*el / ea*
REFLEXIVE	100%	*el însuşi / ea însaşi*	99.3%	*el / ea*
DISJOINT	14.6%	*acesta / aceasta*	0.6%	*el / ea*

Table 4.20: Rate of Reflexive Interpretation by Condition in Experiment 4. PRONOUN: *el / ea* - 'him / her'; *el însuşi / ea însaşi* - 'him himself / her herself'; *acesta / aceasta* -'this one.MASC, this one.FEM.'

	Nested Model: Condition/Competition		
Condition	*Estimate*	*SE*	*z value*
INTERCEPT: AMBIGUOUS	0.47	0.38	1.25
REFLEXIVE	**5.8**	**1.13**	**5.16*****
DISJOINT	**-6.56**	**1.08**	**-6.07*****
AMBIGUOUS/COMPETITION	**-1.03**	**0.52**	**-1.98***
REFLEXIVE/COMPETITION	16.1	111.7	0.14
DISJOINT/COMPETITION	**3.48**	**1.145**	**3.04****

Table 4.21: Logistic Mixed Effects Model Estimates for the effect of Competition on the rate of Reflexive Interpretation in Experiment 4.
All significant effects are bolded. Legend: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

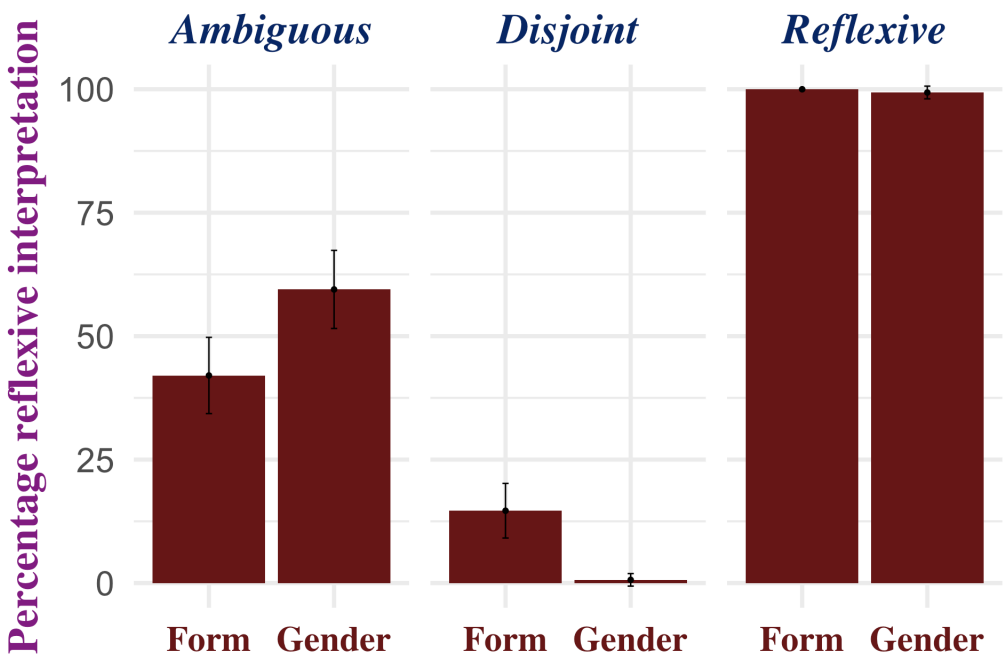
in *Figure 4.6*. The results of the main analysis, logistic mixed effects regression modeling the rate of reflexive interpretation, are listed in *Table 4.21*.

The logistic mixed effects regression model revealed that the rate of reflexive interpretation in the *Disjoint* and *Reflexive* conditions was significantly different from the rate of reflexive interpretation in the *Ambiguous* condition (*Disjoint:* β = -8.3, z = -3.62, SE = 2.29, p <0.001, *Reflexive:* β = 5.8, z = 5.16, SE = 1.13, p <0.001). The model also revealed that the rate of reflexive interpretation in the *Ambiguous* condition, which was the intercept, was not significantly different from chance (*p=0.21*).

There was a significant effect of COMPETITION in the Ambiguous condition (z = -1.98, SE = 0.52, $p < 0.05$) and the *Disjoint* condition (z = 3.04, SE = 1.114, $p <$ 0.01), and no significant effect of COMPETITION in the *Reflexive* conditions.

The mean, median and standard deviation reaction time (RT) data within the

Figure 4.6: Rate of Reflexive Interpretation by Condition in Experiment 4.



six conditions is given in Table 4.22. For the *Ambiguous* condition, which was constant across the two participant groups, the RT data for each interpretation (*Reflexive* or *Disjoint*) is listed in *Table 4.23*. A graphical representation of the RTs for the *Ambiguous* condition by interpretation can be found in *Figure 4.7*. The two groups did not differ significantly in terms of RT when interpreting the *Ambiguous* condition as *Reflexive*. However, as suggested by the descriptive data, participants in the *Form* group were faster than the *Gender* group when choosing a *Disjoint* interpretation for the ambiguous stimuli; the statistical analysis confirms this finding. For the analysis, the RTs were log transformed. *Table 4.24* lists the results of the linear models with log RT as the dependent variable.

With respect to the RT analysis, the nested linear model indicates that while COMPETITION had no significant effect on the reaction time of participants choosing a *Reflexive* interpretation for an *Ambiguous* item, there was a significant difference in terms of RTs between the two participant groups when choosing a *Disjoint*

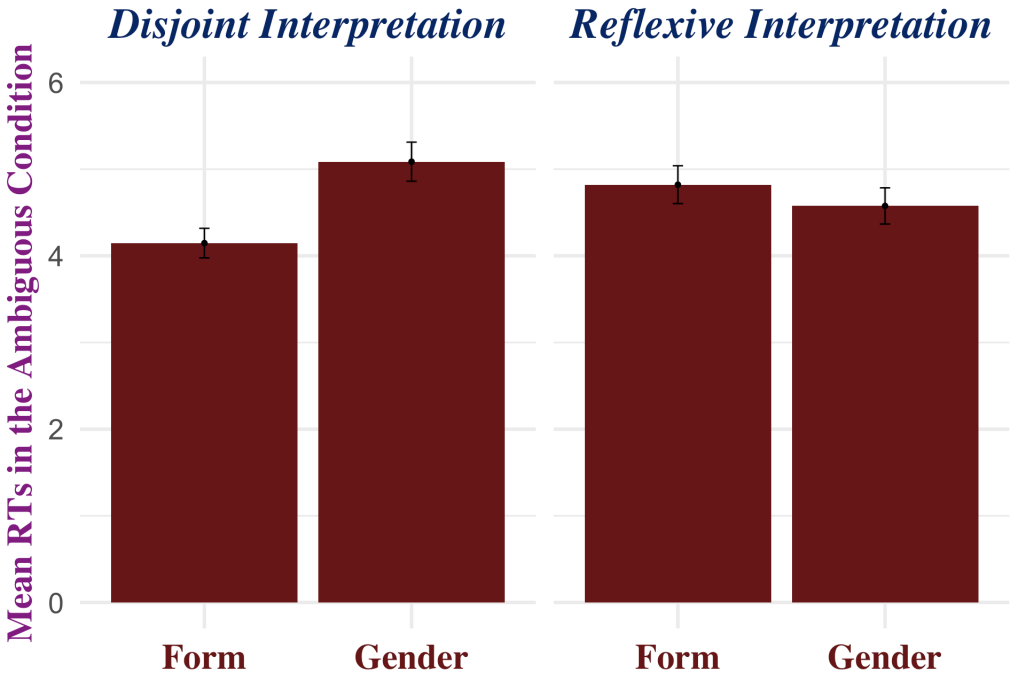
Condition	Ambiguous		Reflexive		Disjoint	
	Form	*Gender*	*Form*	*Gender*	*Form*	*Gender*
Mean RT	4.43	4.78	3.95	3.82	4.29	3.82
Median RT	3.95	4.36	3.45	3.78	3.77	3.46
SD RT	1.72	1.89	0.89	1.27	1.56	1.33
Observations	157	148	156	152	157	154

Table 4.22: Mean, Median and Standard Deviation Reaction Time (in seconds) by condition in Experiment 4.

Interpretation	Reflexive		Disjoint	
	Form	*Gender*	*Form*	*Gender*
Mean RT	4.82	4.58	4.15	5.09
Median RT	4.46	3.92	3.77	4.97
Standard Deviation RT	1.77	1.96	1.63	1.75
Observations	66	88	91	60

Table 4.23: Mean, Median and Standard Deviation Reaction Time (in seconds) in the Ambiguous Condition by Interpretation in Experiment 4.

Figure 4.7: Mean Reaction Time in the Ambiguous Condition by Interpretation Type in Experiment 4.



	Nested Model: Interpretation/Competition		
Factor	*Estimate*	*SE*	*t value*
REFLEXIVE INTERPRETATION	-0.79	0.078	-1
DISJOINT INT./COMPETITION	**-0.17**	**0.08**	**-2.12***
REFLEXIVE INT./COMPETITION	0.04	0.08	0.51

Table 4.24: Linear Mixed Effects Model Estimates for the effect of Competition on Log Reaction Time in Experiment 4. All significant effects are bolded.
Legend: * p $<$ 0.05, ** p $<$ 0.01, *** p $<$0.001.

interpretation for an *Ambiguous* stimulus (*Dissjoint Interepretation/Competition*: β = -0.17, t = -2.12, SE = 0.08, $p < 0.05$). Furthermore, there was no significant effect of *Reflexive Interpretation*, which indicates that across the two participant groups, comprehenders were not significantly faster when choosing either of the two interpretations.

4.4.6 Discussion

With respect to the overall interpretation of ambiguous pronouns across the two participant groups, there were three main alternatives considered at the outset of this experiment: (i) *Binding is Easy*, which predicted that comprehenders would exhibit a preference towards bound variable, hence, reflexive interpretations; (ii) *Pragmatic Listeners*, which predicted an overall preference for disjoint readings; and (iii) *Probabilistic Inferencing*, according to which, based on the production data discussed collected in *Experiment 2* in *Chapter 3*, the predicted rate of reflexive interpretation for ambiguous pronouns is within the range of [52.3%, 71.2%]. According to the comprehension data collected in this study, the overall rate of reflexive interpretation across the two participant groups was 50.75%. Like in *Experiment 3*, these results are more closely predicted by the simplified Bayesian Model adopted in the *Probabilistic Inferencing* hypothesis.

Furthermore, unlike in *Experiment 3*, the intercept in the main logistic analysis,

which corresponded to the *Ambiguous* condition, was not significantly different from 0, which means that the rate of reflexive interpretation in this condition was not significantly different from chance. Therefore, these results are not compatible with the *Binding is Easy* or the *Pragmatic Listeners* hypotheses. Like in *Experiment 3*, there is a significant effect of the *Reflexive* and *Disjoint* factors, with participants opting for significantly more reflexive readings in the *Reflexive* condition (the rate of reflexive interpretation by participant group in this conditions was at ceiling 100%, and 99.3% respectively) than in the *Ambiguous* condition (the rate of reflexive interpretation by participant group in this conditions is 42%, and 59.5% respectively), and significantly fewer reflexive readings in the *Disjoint* condition (14.6%, and 0.6% respectively).

Whereas no significant effect of COMPETITION was found for the *Ambiguous* stimuli in *Experiment 3*, in the case of items with quantified subjexts, there was a main effect of COMPETITION on the rate of reflexive interpretation in the *Ambiguous* condition ($p < 0.05$). Descriptively, there was a 17.5% difference in the rate of reflexive interpretation, participants in the *Form* group having chosen a reflexive reading more often than those in the *Gender* group.

A significant effect of COMPETITION on the rate of reflexive interpretation was once again found for the *Disjoint* condition ($p < 0.01$). As illustrated in *Figure 4.6* and *Table 4.20*, participants assigned a reflexive reading to the items in the *Disjoint* condition in the *Form* group 14.6% of the time, whereas participants in the *Gender* group only did so for 0.6% of the stimuli. For the *Gender* group, this interpretation is implausible given the gender mismatch between the sentence subject and the target pronoun. This confirms that even in the case of sentences with quantified subjects, while there is a strong preference to interpret *acesta / aceasta* 'this one' as disjoint from the sentence subject, a reflexive interpretation is still plausible for some speakers.

In terms of RTs, there was a significant effect of COMPETITION ($p < 0.05$) for the *Ambiguous* condition when participants interpreted these stimuli as disjoint. As illustrated in *Figure 4.7*, participants in the *Form* group were faster to assign a disjoint reading to an ambiguous item than participants in the *Gender* group. In *Experiment 3*, where the subjects were referential, the reverse effect is observed for the *Reflexive* reading of *Ambiguous* items: participants in the *Gender* group assigned reflexive readings faster. Once again, this difference in RTs between the two groups is evidence that the activation of specialized reflexive forms, i.e. the emphatic reflexive, significantly affects the processing of regular pronouns. When specialized forms are available, participants more readily assign regular pronouns a *disjoint* interpretation.

4.5 General Discussion

The main goal of the two comprehension experiments reported in this chapter was twofold. The main question of interest regarded how Romanian speakers interpret pronouns which are ambiguous between reflexive and non-reflexive interpretations. A secondary question was whether there is evidence of competition between forms. These questions are addressed in the subsections below.

4.5.1 Resolving the ambiguity

With respect to the resolution of pronouns which are ambiguous between a reflexive and disjoint reading, we considered three main alternatives. The *Binding is Easy* hypothesis adopted in Wagers et al. (2018) on the basis of the assumption that bound variable readings are *less costly* than other types of reference relations (Reinhart, 1983a; Reuland, 2001, 2011) predicted an overall preference towards reflexive interpretations. The second alternative, *Pragmatic Listeners*, theo-

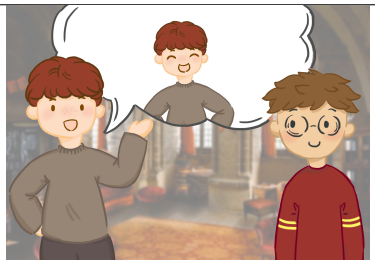
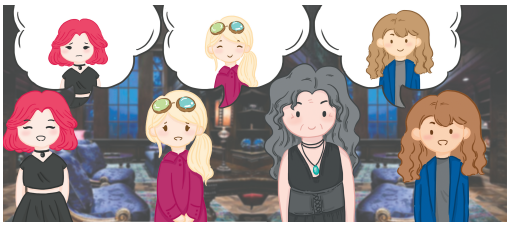
	Referential Subjects		Quantified Subjects	
Sample Picture				
	Form Group	*Gender Group*	*Form Group*	*Gender Group*
Reflexive by Group	52.2%	62.1%	42%	59.5%
Overall Reflexive	**57.15%**		**50.75%**	
Disjoint by Group	47.8%	37.9%	58%	40.5%
Overall Disjoint	**42.85%**		**49.25%**	

Table 4.25: Rate of Reflexive and Disjoint Interpretation of Ambiguous Pronouns by Subject Group

retically motivated by pragmatic competition based accounts of disjoint reference Dowty (1980); Levinson (1987), according to which hearers expect their speakers to produce unambiguous sentences, predicted an overall preference towards disjoint interpretations of ambiguous pronouns. Lastly, the *Probabilistic Inferencing* hypothesis, according to which the comprehension data can be seen as a function of the production data, predicted there to be no clear preference towards any of the two available readings.

Table 4.25 lists the rates of reflexive and disjoint interpretations of regular pronouns which were ambiguous between the two readings for each participant group within the two experiments, as well as the overall rates of reflexive/disjoint interpretation by averaging the performance of the two groups. Across the two experiments, participants in the *Form* group interpreted sentences uttered by a generally *cooperative* speaker, who obeyed *Be Clear!* and avoided ambiguity in 2/3 of the experimental items (where reflexive and disjoint readings were conveyed by means of emphatic reflexives and demonstratives, respectively), while participants in the *Gender* group interpreted sentences uttered by a speaker who only obeys *Be Small!*,

and thus only uses regular pronouns in both ambiguous and unambiguous scenarios.

The prediction of the *Pragmatic Listeners* hypothesis that comprehenders would have strongly preferred disjoint reference readings is unmet. The overall rate of disjoint reference interpretation of ambiguous pronouns in the two experiments is 42.85% and 49.25%, respectively, which is not significantly different from chance.

Comparing the *Binding is Easy* hypothesis with the collected data, the prediction of a *strong* preference towards bound variable readings is also unmet. The mixed effects logistic regression model only found that this rate is significantly different from chance in the *Referential Subjects* experiment, where the average rate of reflexive interpretation in the *Ambiguous* condition was 57.15%. While these results are compatible with the *Binding is Easy* hypothesis, they do not support the assumption that bound variable LFs are *easier* than reference relations established at the level of discourse.

A complication that arises in the interpretation of the slight preference for reflexive readings recorded in *Experiment 3* is the fact that it does not replicate in *Experiment 4*. In *Experiment 3*, the *reflexive interpretation* can be acheived either via a bound variable LF, or via coreference. In *Experiment 4*, however, since the subject is a quantified expression, the only means of establishing a reflexive interpretation is via variable binding. Should the slight preference for reflexive readings in *Experiment 3* be due to bound variable LFs winning the competition with the LFs expressing coreference and disjoint reference, then this preference should have been replicated, and perhaps even stronger, in *Experiment 4*, where bound variable LFs only compete with LFs expressing disjoint reference.

It appears, that at least for the interpretation of ambiguous pronouns in Romanian, the best predictor of the comprehension data is the Bayesian model of the *Probabilistic Inferencing* hypothesis. Romanian comprehenders showed no clear

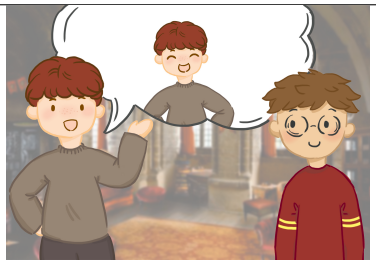
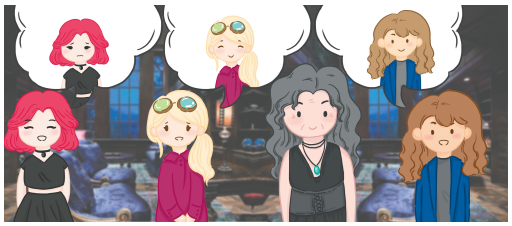
	REFERENTIAL SUBJECTS	QUANTIFIED SUBJECTS
Sample Picture		
Predicted Reflexive	**[47.7%, 67.2%]**	**[52.3%, 71.2%]**
Overall Reflexive	**57.15%**	**50.75%**
Predicted Disjoint	**[32.7%, 52.3%]**	**[28.7%, 47.7%]**
Overall Disjoint	**42.85%**	**49.25%**

Table 4.26: Predicted Rate of Reflexive and Disjoint Interpretation of Ambiguous Pronouns vs. Actual Comprehension Results.

overall preference for any of the two readings. *Table 4.26* compares the predicted values of this model with the overall rates of reflexive and disjoint readings for ambiguous pronouns for each of the two experiments. Given that the two comprehension experiments, unlike the two production experiments, also manipulated the competition between different pronominal forms in terms of a between-subjects factor, and given that the production data was used to predict the interpretation data, we cannot expect to accurately model the rates of reflexive and disjoint interpretations in the two participant groups, *Form* and *Gender*, which were not a factor of the production study design. However, the collected production data *can* be used to predict the overall rates of reflexive and disjoint interpretation obtained by averaging the performance of the two groups for each experiment. As shown above, for the *Referential Subjects* experiment, the predicted data and the actual rates of reflexive and disjoint interpretation are remarkably close. The overall rates of reflexive and disjoint interpretation in the *Quantified Subjects* experiment are not within the ranges predicted by the Bayesian model, although they are very close (2% outsde of the predicted ranges). This, as mentioned in the previous sections, is due to there being 3 extra readings in the *Quantified Subjects* experiment which

were not taken into account in the Bayesian estimates. Given these three additional disjoint readings, the probability of a reflexive reading should be lower than in the *Referential Subjects* experiment and it is therefore unsurprising that the Bayesian Model cannot make an exact prediction. Yet, of the three hypotheses considered, the *Probabilistic Inferencing* hypothesis is a better predictor of the comprehension data in both experiments.

The fact that the Bayesian model performs outperforms the other hypotheses despite the additional *Form/Gender* design complication in comprehension is not necessarily surprising. I suggest that in real life conversation, and as also observed in terms of the inter-speaker variation in the Romanian production experiments, speakers are on a spectrum with respect to how *cooperative* or mindful of pragmatic constraints like *Be Clear!* they might be. There are speakers who might seldom obey *Be Clear!* and speakers who might almost always obey *Be Clear!*. The same is true of the participants in the production data: some speakers exhibit a strong preference to use regular pronouns, even in ambiguous contexts, while others prefer to use emphatic reflexives when intending a reflexive reading in a scenario where using a regular pronoun would have been ambiguous.

As previously mentioned, the Bayesian model is merely an oversimplification of the hypothesis that comprehension is a function of production. In order to appropriately test this model and to to determine the precise relationship between production and comprehension, a much larger longitudinal study needs to be carried out, with many more observations per participant. Furthermore, a truly powerful probabilistic model would have access to the inherent probabilities of reflexive interpretation of each different predicate, of each pronoun in real-time conversation, of each syntactic structure, etc. In order for our studies to reach this level of precision with respect to real-world language, more limited experiments, such as those presented here, need to be carried out, across languages, syntactic con-

texts, and discourse contexts, in order to refine our assumptions and our claims about probabilities and the relationship between production and comprehension in natural language.

4.5.1.1 Chamorro

As discussed above, the predictions of the *Binding is Easy* hypothesis adopted by Wagers et al. (2018) were unmet in Romanian. Unlike in the experiment reported by Wagers et al. (2018) in Chamorro, Romanian comprehenders did not exhibit a strong preference towards a reflexive interpretation of ambiguous 3rd person pronouns in *Experiment 4*, and only a slight preference for reflexive readings (57.15%) in *Experiment 3*.

I argue that the preference for the 3rd person Chamorro pronoun *gui'* to be interpreted as reflexive is unsurprising given the pronominal facts in this language. For one, as observed by Wagers et al. (2018), reflexive pronouns are necessarily overt, while disjoint pronouns are either null or overt. The competition, then, is not only one at the level of interpretation, between the disjoint reading of *gui'* and the reflexive reading of *gui'*, but also one at the level of morphological form: between *gui'* and the null pronoun. Since the null direct object is a specialized form for disjoint reference, the overt pronoun *gui'* can be more readily associated with a bound variable interpretation. Under a competition based account of reference, since reflexive *gui'* is always overt, there can be a division of labor between the two constructions: null direct objects are preferred for disjoint readings, while *gui'* direct objects are preferred for reflexive readings. The experimental findings of Wagers et al. (2018) corroborate this assumption.

4.5.2 Competition between forms

A secondary aim of these experiments was to determine whether there is any effect of *competition between forms* on the interpretation of 3rd person pronouns which are ambiguous between reflexive and disjoint readings. The hypothesis that complex reflexives *do not* compete with regular pronouns, following Safir (2004) and Rooryck & vanden Wyngaerd (2011), predicts that there should be no difference in the rate of reflexive interpretation of the ambiguous pronouns as a function of the availability of competing forms. However, if there is competition between these two forms, then we expect *fewer* reflexive readings of ambiguous pronouns when unambiguously reflexive forms are available.

The main hypothesis of the experimental manipulation targeting COMPETITION was that increasing the availability of complex reflexives by means of experimental priming, like in the *Form* group, would affect the interpretation of regular pronouns. While there was no significant effect of COMPETITION on the interpretation of ambiguous pronouns in *Experiment 3*, there was a considerable effect descriptively, which is consistent with there having been a power issue: more observations were needed to obtain statistical signficance. The mixed effects logistic regression model found a significant effect of COMPETITION in *Experiment 4*. The experimental evidence that the emphatic reflexive *el însuşi does* compete with regular pronouns in the expression of bound variable readings, and that this competition leads to more disjoint readings for the ambiguous pronouns, is unexpected under Safir (2004) and Rooryck & vanden Wyngaerd (2011) models of pronominal competition, whereby complex reflexives are assumed not to be a part of the relevant competition.

Furthermore, the reaction time data illustrates an effect of COMPETITION in both experiments. In *Experiment 3*, participants in the *Gender* group were faster to assign a reflexive reading to ambiguous pronouns than participants in the *Form*

group. This state of affairs can be seen as evidence that, when comprehenders actively consider the set of referential expressions a speaker *might* have used to express a reflexive reading, as in the *Form* group, this leads to longer reaction times.

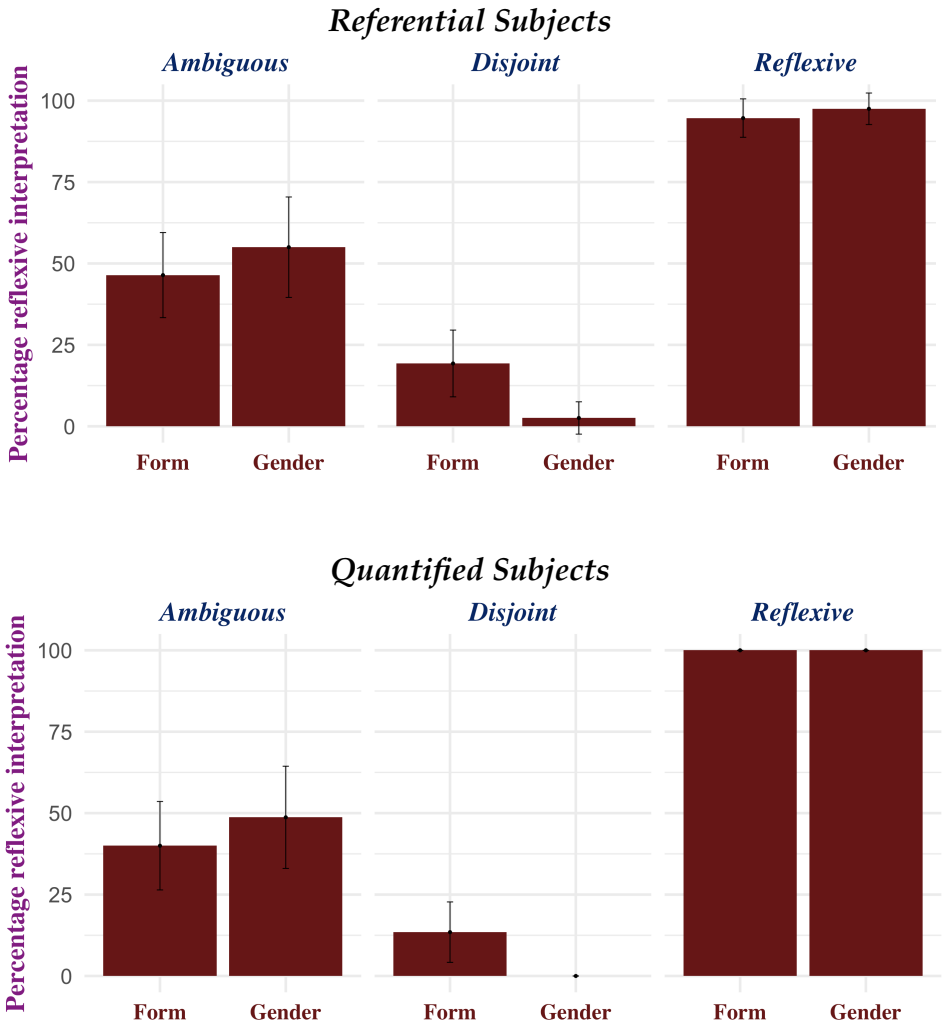
In *Experiment 4*, participants in the *Form* group were faster to choose a disjoint reading for the ambiguous regular pronouns than participants in the *Gender* group. Once again, this provides further evidence in favor of the hypothesis that regular pronouns and emphatic reflexives compete. One prediction of this hypothesis is that comprehenders should more readily achieve a disjoint interpretation of regular pronouns like *el* when the emphatic reflexive is an active competitor, as in the *Form* group. Thus, the fact that the *Form* group registered lower RTs for than the *Gender* group is compatible with the hypothesis that emphatic reflexives compete with regular pronouns in the expression of a bound variable relation.

The comprehension experiments also provide evidence that *el însuşi* and *acesta* differ in terms of cue validity. One prediction from the production data was that the cue validity of *el însuşi* for reflexive readings is higher than that of *acesta* for disjoint reference. The results from the two comprehension experiments discussed in this section illustrate that *el însuşi* led to a reflexive reading 95.7% and 100% of the time, respectively, while *acesta* led to a disjoint reading 84.1% and 85.4% of the time, respectively. Thus, emphatic reflexives are a stronger cue of reflexivity than demonstratives are of disjoint reference.

4.5.3 Repeated Participants

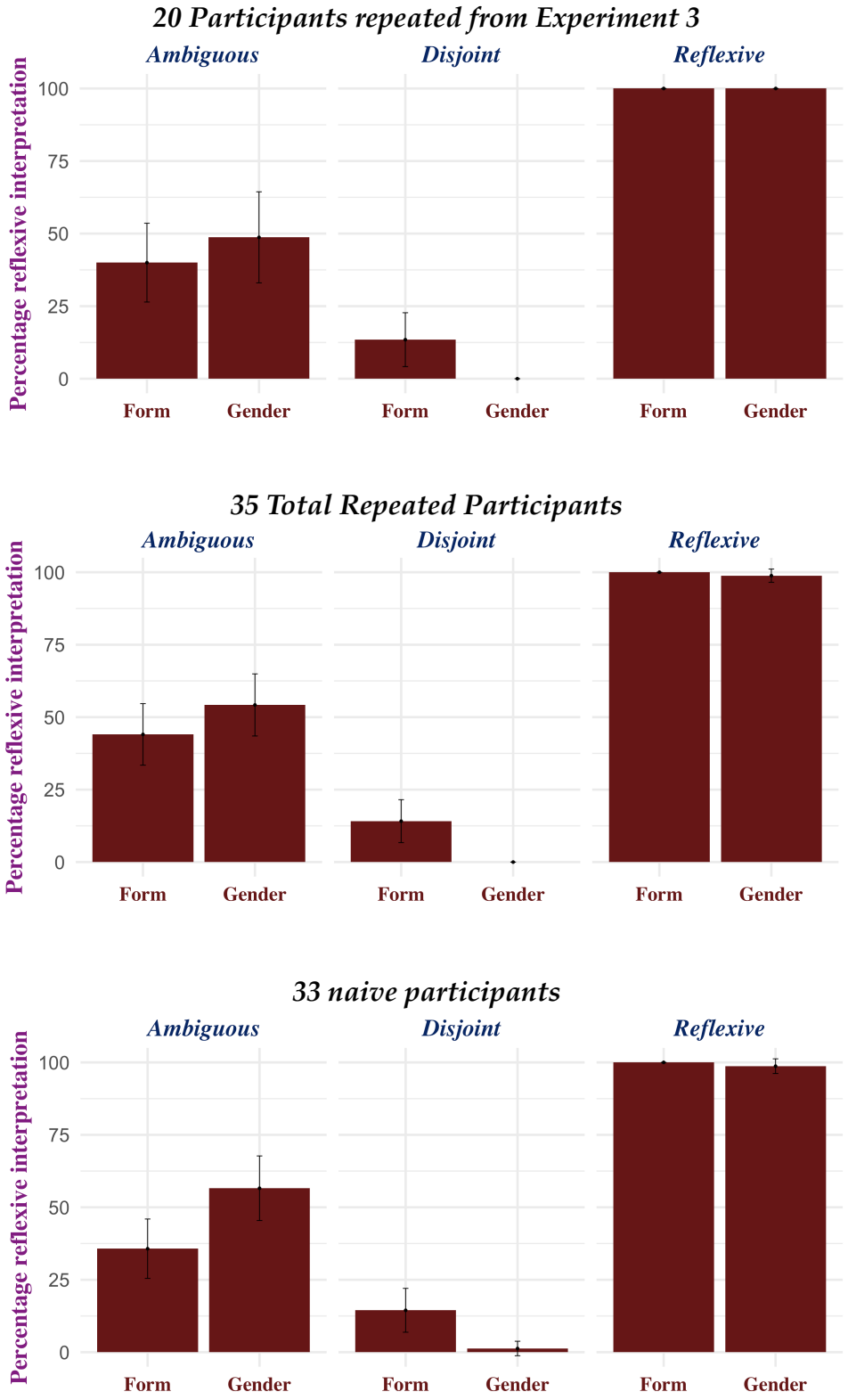
As laid out in the discussion of the recruiting procedure for the two experiments in this chapter, 20 of the participants in *Experiment 3* also took part in *Experiment 4*. A cross-experimental comparison of the interpretative choices of the repeated participants further allows us to ascertain whether there are differences in interpretation between coreference and binding proper. Given that a pronoun may only be re-

Figure 4.8: Repeated Participants: Experiment 3 vs. Experiment 4.



flexive to a quantifed subject if a binding relation is established between the two, and given that referential subjects may either corefer with or bind a pronoun that targets the same referent, we might expect that a difference between coreference and binding in interpretation would be reflected in the results of *Experiment 3* and *Experiment 4*. However, as illustrated in *Figure 4.8*, the 20 repeated participants do not seem to behave differently with respect to referential or quantified antecedents. Descriptively, the 20 Romanian speakers which took part in both *Experiment 3* and *Experiment 4* had similar interpretative patterns across the two studies, providing further reason to be dissuaded from the *Binding is Easy* hypothesis.

Figure 4.9: Experiment 4 Population Comparison.



Having repeated participants from *Experiment 3* also allows for an exploratory comparison between these two populations in *Experiment 4*: participants who had been exposed to a similar design, *Experiment 3*, 4 months prior to *Experiment 4* and naive participants who had not taken part in any prior experiment. As a reminder, of the 68 total participants in *Experiment 4*, only 33 were completely naive: 15 participants had taken part in *Experiment 1*, the production study, and 20 in *Experiment 3*, as discussed above. *Figure 4.9* illustrates the rate of reflexive interpretation in *Experiment 4* of the 20 repeated participants from *Experiment 3*, the rate of reflexive interpretation of all 35 repeated participants, and that of the 33 new participants. Descriptively, the rates of reflexive interpretation do not differ across the six conditions with the exception of the *Gender* group in the *Ambiguous* condition. Repeated participants from *Experiment 3* chose a reflexive reading in this environment 47.5% of the time, while the naive participants in the *Gender* group opted for a reflexive reading in the *Ambiguous* condition 56.6% of the time.

The small difference between the two populations might be taken to indicate that previous exposure to *Experiment 3* reduced the rate of bound variable interpretation of regular pronouns in contexts where there are no competing forms: the *Gender* group. It is possible that the repeated participants were more aware of the intrinsic ambiguity of regular pronouns and less likely than naive participants to assign a reflexive reading in this context. However, given that, with respect to the *Ambiguous* condition in the *Gender* group, we are comparing the results of 9 repeated participants and 16 naive participants, not much stock should be placed in the 9% difference between the two participant groups in the *Gender x Ambiguous* condition.

Finally, in *Experiment 3*, the comprehension task with referential subjects, half of the participants had also taken part in *Experiment 1*, the production task with referential subjects. The purpose was to assess how strongly correlated an individ-

ual's pronoun production and pronoun comprehension are in this environment. In determining whether a speaker's choices are a goood indicator of their comprehension, we can take the individual's rates of pronoun production and plug them into *Bayes' Rule*.

(147) *Bayes' Rule*

$$\mathrm{P}(\mathtt{reflexive}|el) = \frac{\mathrm{P}(el|\mathtt{reflexive}) * \mathrm{P}(\mathtt{reflexive})}{\mathrm{P}(el|\mathtt{reflexive}) * \mathrm{P}(\mathtt{reflexive}) + \mathrm{P}(el|\mathtt{disjoint}) * \mathrm{P}(\mathtt{disjoint})}$$

Based on the production data, we can assume the following. We can take p(reflexive) and p(disjoint) to be 0.5, given that in *Experiment 1* and *Experiment 3* there are only two available referents for each item. The probabillity of a regular pronoun being used in a reflexive or disjoint context can be taken from each speaker's rate of pronoun production in *Experiment 1*, in the *Reflexive* and *Disjoint* conditions, respectively. Given these assumptions about each participant's production bias, we can estimate the probability of that speaker assigning a reflexive reading to an ambiguous pronoun in the comprehension task.

The statistical analysis of the fit of this model, with the rate of reflexive interpretation in comprehension as the dependent variable and the predicted rate of reflexive interpretation as the factor, did not reveal a significant effect. As illustrated in *Figure 4.10*, the *Bayes* model is not a good predictor of each participant's choices in comprehension.

However, this result should too be taken with a grain of salt. *Bayes' Rule* is an incredibly powerful probabilistic tool, and, as we have seen in this chapter, a good predictor of the overall comprehension results. However, its effectiveness cannot be assumed to predictions made on a handful of observations. In the *Ambiguous* condition of the comprehension task, there are only 5 observations from each participant (projected on the Y axis of *Figure 4.10*). Furthermore, the probability es-

Figure 4.10: By Participant Predicted Rate of Reflexive Interpretation based on Experiment 1 (X Axis) vs. Actual Rate of Reflexive Interpretation in Experiment 3 (Y Axis).

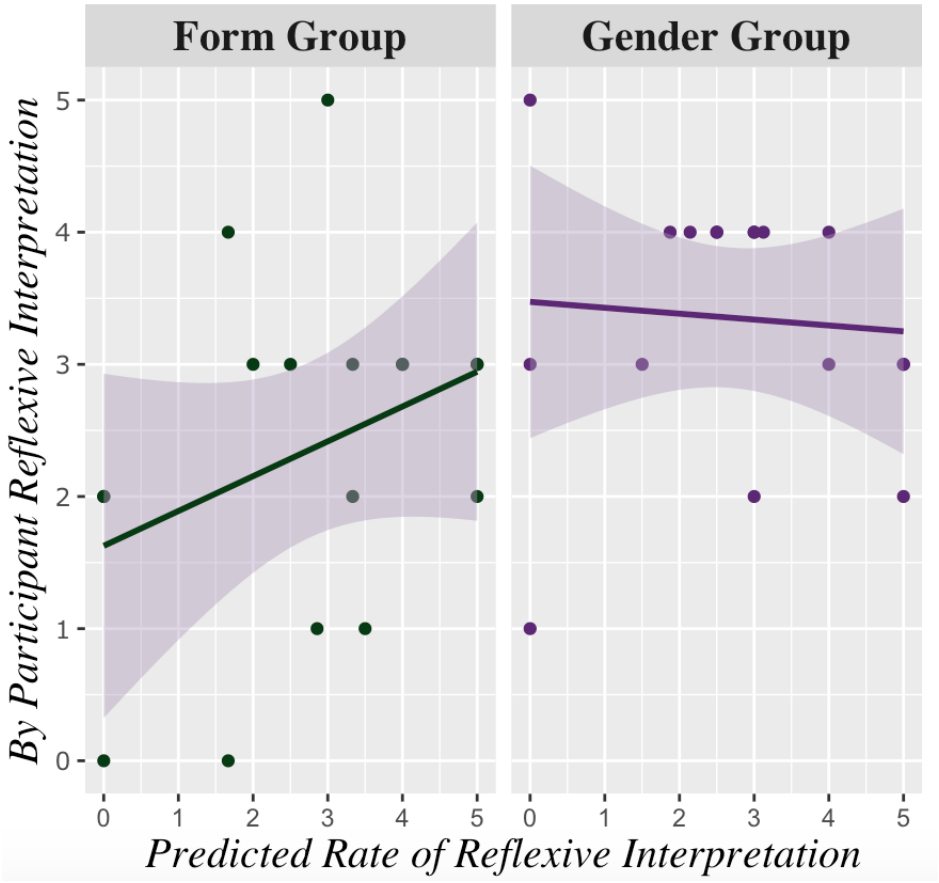
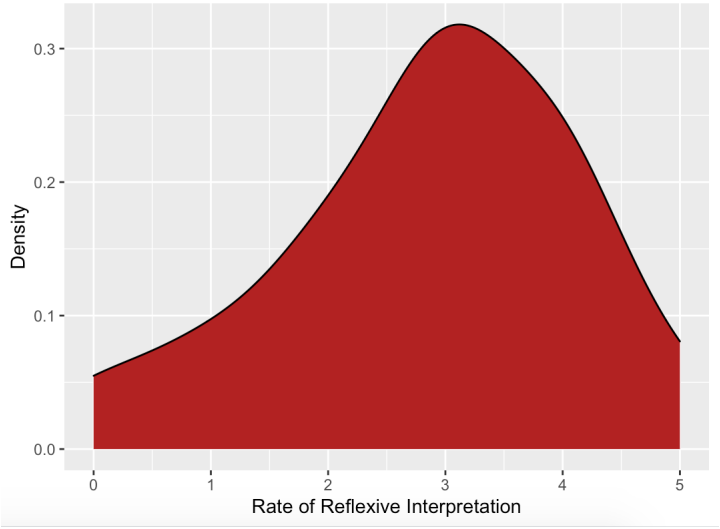


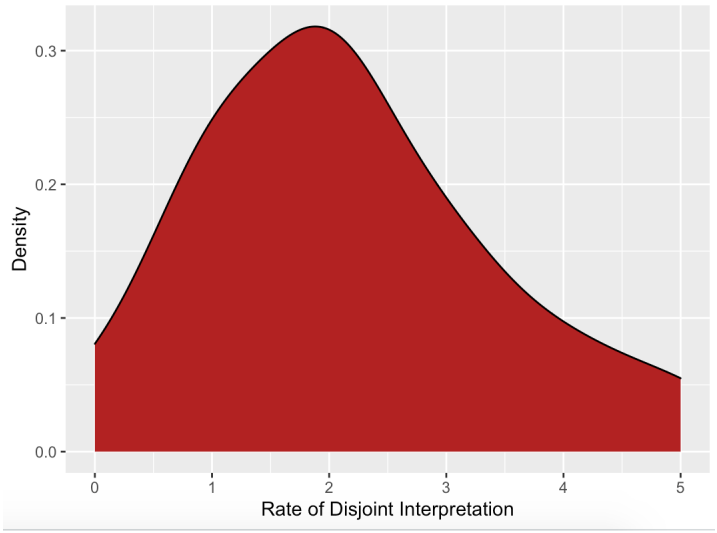
Figure 4.11: Repeated Participants: Reflexive Interpretation Density Curve.



timates plugged into *Bayes' Rule* are based on 8 observations per participant in each of the two contexts: *Reflexive* and *Disjoint*. In a higher powered experiment, where more data is collected from each participant in both production and comprehension, the *Bayes* model would be expected to perform well on individual-level predictions as well. Therefore, the lack of fit of the *Bayes* model for the individiual-level comparison between production and comprehension is unsurprising with this dataset, but the effectiveness of this model should greatly increase in a larger experiment.

As illustrated in *Figure 4.10*, there are participants who had never produced regular pronouns in the production experiment in a *Reflexive* condition (those plotted on the line with coordinate 0 on the X axis), as well as participants who only produced regular pronouns in a *Reflexive* condition (those plotted on the line with coordinate 5 on the X axis). This might have been an indication that, perhaps, there are two different populations: those that obey BE CLEAR! and those that do not. However, the population density graphs in *Figure 4.11* and *Figure 4.12* confirm that this is not the case.

Figure 4.12: Repeated Participants: Disjoint Interpretation Density Curve.



The density curves for the rate of reflexive interpretation in *Figure 4.11* and the equivalent for the rate of disjoint reference interpretation in *Figure 4.12* indicate that there is a unimodal distribution of participant interpretation preferences, even though, in production, some of these participants might have been misassociated with categorical effects of BE CLEAR! or of the lack thereof. These graphs serve as further incentive to argue that BE CLEAR! is a linguistic constraint active across speakers, as opposed to a speaker-internal preference which can be switched off.

CHAPTER 5

CONCLUDING REMARKS

Classic and competition based approaches of the *Binding Theory* account for the distribution of pronouns and reflexives and can succesfully capture languages where these pronominals are in complementary distribution. As shown in *Chapter 2*, these previous approaches are insufficient when it comes to languages like Romanian where no strict complementarity is observed. A cross-linguistic generalization which seems to hold, however, is that of *ToC* repeated in (148) below.

(148) **TERMS OF COMPETITION (TOC)**

When choosing between two pronominal forms, P and P', choose P' iff:

i. P and P' have *indistinguishable interpretations* in a context C, and

ii. P' is a (non-logophoric) reflexive pronoun, whereas P is a pronoun

I proposed that this generalization can be captured by an overarching pragmatic principle, BE CLEAR!, along the lines of Dowty (1980) and Levinson (2000). According to (149), speakers avoid using pronouns in contexts where a less ambiguous alternative is available.

(149) **BE CLEAR!**

Given a context C, when choosing between two alternative sentences, S and S', both of which include a non-logophoric pronominal form in the same syntactic position, speak S' iff:

i. S and S′ have *indistinguishable interpretations* in C, and

ii. the set of possible interpretations for S′ is a **proper subset** of the set of possible interpretations for S.

As shown in *Chapter 2*, BE CLEAR! can account for the distribution of pronouns and reflexives in English, as well as for the distribution of reflexive and non-reflexive clitics in Romanian. In the case of non-transitive predicates, where clitics do not restrict the interpretation of Romanian pronouns, BE CLEAR! does not lead to grammaticized preferences. Nevertheless, as evinced by the production experiments in *Chapter 3*, BE CLEAR! is an active constraint in the case of pronominals in prepositonal object position as well, with participants having chosen the less ambiguous emphatic reflexive *el însuşi* more often in contexts where the regular pronoun *el* would have been ambiguous.

The production data also suggested that BE CLEAR! is not the *only* active constraint in determining the choice of a pronominal form, with participants having preferred the regular pronoun *el* in unambiguous contexts. I argued that there is at least one additional constraint responsible for the distribution of pronouns and reflexives, namely the syntactic economy constraint BE SMALL!.

(150) **BE SMALL!**

For any two DPs A and B, choose A iff:

i. A and B have the same denotation

ii. both A and B are grammatical in this position, and

iii. A has a proper subset of the syntactic nodes that B has.

According to the definition in (5), BE SMALL! ranks less syntactically complex expressions over more complex ones. Like in the case of Romanian clitics, BE SMALL! does not distinguish between the English pronoun *him* and the reflexive *himself*, since they share the same syntactic structure. In this sense, the application of BE

CLEAR! leads to grammaticized preferences: *himself* is less ambiguous than *him*. In the case of Romanian and Old English pronouns and reflexives, as well as in the case of English possessives *his* and *his own*, BE SMALL! ranks the smaller forms above the more complex ones, while BE CLEAR! has the opposite effect: the more complex forms are less ambiguous. I claimed that since the two constraints do not converge, both types of pronominals survive the competition and no clear winner is chosen. For this reason, the effect of BE CLEAR! is only noticeable in truly ambiguous contexts, like those in the production experiments in *Chapter 3*.

The assumption that regular pronouns like *el* compete with complex reflexives like *el însuşi* is not supported by previous competition based accounts like Safir (2004) and Rooryck & vanden Wyngaerd (2011). The results from the comprehension experiments in *Chapter 4*, however, provide evidence in favor of this competition: participants opted for disjoint interpretations of ambiguous regular pronouns more often when the emphatic reflexive was a more active competitor. In this sense, the comprehension experiments also provide evidence against Safir (2004) and Rooryck & vanden Wyngaerd (2011).[1]

Furthermore, the data discussed in *Chapter 4* is incompatible with accounts which assume a processing preference of bound variable LFs (Reinhart, 1983a, 2006; Roelofsen, 2010; Reuland, 2001, 2011). These accounts make the unmet prediction that, in ambiguous contexts, the regular pronoun *el* should have led to a strong preference of a bound variable (or reflexive) reading. At the same time, the experimental results are also incompatible with purely pragmatic accounts of the *Binding Theory*, like Levinson (1987) and Levinson (2000), which predict that participants would overwhelmingly opt for a disjoint reference reading in ambiguous contexts. Instead, as discussed in *Chapter 4*, the comprehension data is best predicted by simple probablistic inferencing, whereby the overall comprehension

[1]Furhter evidence against the system proposed in Rooryck & vanden Wyngaerd (2011) can be found in the *Appendix*.

preferences can be modeled based on the production data.

The assumptions underlying the two proposed constraints, BE CLEAR! and BE SMALL! are by no means new. These constraints are inspired by pragmatic (Dowty, 1980; Levinson, 1987) and morphosyntactic competition based accounts (Burzio, 1989; Safir, 2004; Rooryck & vanden Wyngaerd, 2011), which, in the literature, are typically at odds with each other. Instead of divorcing the two approaches, the experimental data discussed in this dissertation indicates that pragmatic and morphosyntactic constraints *jointly* determine the distribution and interpretation of pronominal forms.

By no means do I claim that these two constraints are the only ones responsible for referential facts. The Romanian data, for instance, suggests that the frequency of a given form, at least, might also play a role. Nevertheless, one primary goal of this dissertaton was to show that cross-linguistic binding patterns can be captured by more generic violable pragmatic and economy based constrants, as opposed to grammaticized principles and language-specific stipulations.

Finally, not only do the experimental results show that BE CLEAR! is active with respect to the competition between various pronominal forms, but they also provide evidence of a more generic ambiguity avoidance constraint which also regulates the competition between pronouns and other referential expressions. While this dissertation, for lack of space and time, focused on capturing Condition B effects, the system proposed here can be tweaked to also account for Condition C effects. I leave this deceivingly simple task as well as the cross-linguistic experimental investigation of other pronominal systems for future research.

APPENDIX A

DISSOLVING BINDING THEORY

In the main text of the dissertation, I present counterarguments to previous *Binding Theory* accounts, including Safir (2004), Reuland (2011) and Rooryck & vanden Wyngaerd (2011). In this appendix, I discuss further unmet predictions of the Rooryck & vanden Wyngaerd (2011) system which have not yet been observed in the literature.

The Rooryck & vanden Wyngaerd (2011) System

Like Burzio (1989), Rooryck & vanden Wyngaerd (2011) argue in favor of an economy-modulated competition based approach according to which pronouns are *Elsewhere* forms, to be used when reflexives are absent. Following Reuland (2001), Rooryck & vanden Wyngaerd (2011) posit that binding relations are a byproduct of AGREE, the mechanism of which is given in (151). Inspired by Kratzer (2009) and similarly to Safir (2014), they argue that bound variables are minimal pronouns which receive their ϕ-features by virtue of an AGREE relation with an antecedent.[2]

[2]Although in Kratzer (2009) minimal pronouns have their own index feature, the Rooryck & vanden Wyngaerd (2011) system does not employ indices, so as not to violate the *Inclusiveness* condition of the *Minimalist Program*, according to which novel material is prevented from being introduced in the course of a derivation (Chomsky, 1995, p. 225).

(151) *Rooryck & vanden Wyngaerd (2011)'s Agree*

a. Agree involves a probe α that has one or more unvalued features and a goal β that has matching (i.e identical) valued features.

b. Agree is an asymmetric feature valuation operation that values the features of α with the features of β at a distance in a local domain.

c. α c-commands β and there is no potential alternative goal γ such that
α asymmetrically c-commands γ, and
γ asymmetrically c-commands or dominates β.

(Rooryck & vanden Wyngaerd, 2011, ex. (6), p.9)

The definition of AGREE above comes equipped with a locality restriction: feature sharing takes place on a phase-by-phase basis. Given the assumption that AGREE operates within a probe's c-command domain, this system requires that anaphors c-command their antecedents. Rooryck & vanden Wyngaerd (2011) suggest that *self*-reflexives like *himself* covertly move to a position from which they can probe for a goal (Rooryck & vanden Wyngaerd, 2011, p. 152), thus functioning as binders, rather than bindees, as illustrated in (153) below.

The proposal is that reflexive pronouns enter the derivation with unvalued features, which are later valued by means of the AGREE operation with an antecedent. The agreeing mechanism does not lead to feature copying, but to *feature sharing*. Rooryck & vanden Wyngaerd (2011), following Frampton & Gutmann (2000, 2006), adopt a notational convention whereby shared feature values (via AGREE) are marked by an asterisk. The underlying assumption is that the interface levels can distinguish between the inherently valued features of an unbound pronoun and the shared features (marked by an asterisk) of bound anaphora. Under this view, there is a crucial distinction between pronouns and anaphora: pronouns are lexically valued, anaphors are not. Since pronouns enter the derivation already equipped with features, an AGREE relation need not take place.

(152) *Rooryck & vanden Wyngaerd (2011)'s ϕ-feature conventions*

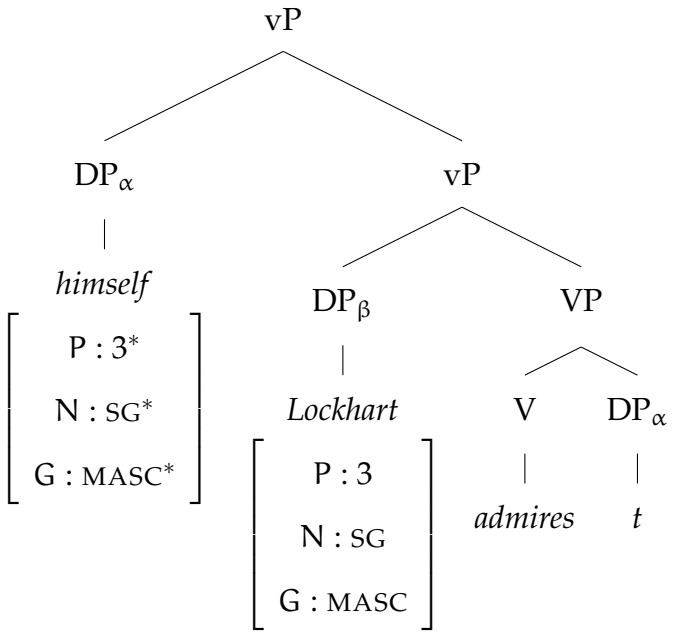
a. {P: 3, N:SG, G:M} lexically valued features (e.g. goal)

b. {P:_, N:_, G:_} unvalued features (probe)

c. {P: 3*, N:SG*, G:M* } features valued after AGREE (probe)

(Rooryck & vanden Wyngaerd, 2011, ex. (7), p.10)

(153) Moved *self*



The reflexive *himself*, whose feature bundle is underspecified upon base-generation [P: - , N: - , G: -], moves from the object position of the VP, adjoins to the *v*P, and agrees with *Lockhart*, which leads to feature sharing. Features obtained via AGREE are marked with a star, and after having moved and underwent AGREE with the antecedent, *Lockhart*, the reflexive's feature bundle becomes [P: 3*, N: SG*, G: MASC*]. NPs carrying starred features are interpreted as being bound by the NP they underwent feature sharing with. As for pronouns, under the assumption that *him* comes equipped with its own valued features, and hence no Probe, *him* would not need to undergo AGREE, and, consequently, would not be bound by *Lockhart*.[3] The morphological realization of bound minimal pronouns takes place

[3]In Rooryck & vanden Wyngaerd (2011) logophors enter the derivation with valued features

post-syntactically, via a mechanism rooted in Distributional Morphology and governed by the *Subset Principle* given below.

(154) SUBSET PRINCIPLE

> The phonological exponent of a Vocabulary item is inserted into a morpheme in the terminal string if the item matches all or a subset of the grammatical features specified in the terminal morpheme. Insertion does not take place if the Vocabulary item contains features not present in the morpheme. Where several Vocabulary items meet the conditions for insertion, the item matching the greatest number of features specified in the terminal morpheme must be chosen.
>
> (Rooryck & vanden Wyngaerd, 2011, ex. (15), p.15)

Rooryck & vanden Wyngaerd (2011) claim that according to the *Subset Principle*, a feature bundle that contains a star-marked shared feature value will lexicalize as a reflexive, for instance *sich* in German, while a head with an inherent feature bundle will lexicalize as a regular pronoun, in German *ihn* (in Accusative positions).

(155) a. {P:3^*} $\leftrightarrow$ *sich* / __

b. {P: 3, N:SG, G:M} $\leftrightarrow$ *ihn* / __ accusative case

(Rooryck & vanden Wyngaerd, 2011, ex. (14), p.14)

In essence, various morphological forms compete for the realization of the same bundle of features. And, crucially, according to Rooryck & vanden Wyngaerd (2011), the various competitors are ordered with respect to the *Elswhere Principle*.

(156) ELSEWHERE PRINCIPLE

> Application of a more specific rule blocks that of a later more general one.
>
> (Rooryck & vanden Wyngaerd, 2011, ex. (45), p. 28))

and no AGREE relation is necessary. This is a different view from that of Charnavel & Sportiche (2016), where logophors agree with logophoric operators.

Like the *Subset Principle*, the *Elsewhere Principle* promotes the insertion of the item which matches the most number of features, i.e. the most specific rule. In this sense, Rooryck & vanden Wyngaerd (2011) alude to a definition of *specifity* in terms of set-subset relations of features: a morpheme which is specified for *n* number of features is *more specific* than one specified for *n-1* number of features.

Rooryck & vanden Wyngaerd (2011) propose that pronouns like *him* and reflexive pronouns like *himself* compete for the same syntactic positions. *Him*, as shown below, would come from the lexicon with fully specified features, while *himself* would enter the derivation with unvalued features, probing for a goal. After the AGREE mechanism occurs, the starred (shared) features get spelled out as *himself*, while the unstarred features get spelled out as *him*. By virtue of the *Elsewhere Principle* and under the assumption that starred features are more specific, *himself* will block the insertion of *him* when the expression of a bound variable is intended.

(157) a. *himself*: [P: 3*, N: SG*, G: MASC*]

b. *him*: [P: 3, N: SG, G: MASC]

With respect to semantic interpretation, Rooryck & vanden Wyngaerd (2011) argue that when the features of a DP have been achieved by means of AGREE, the DP is understood to be referentially dependent on the DP it agrees with. When a pronoun has inherent features, it is interpreted as disjoint in reference from the c-commanding DP. Crucially, Rooryck & vanden Wyngaerd (2011) assume that disjoint reference is achieved via a sort of Gricean reasoning (Rooryck & vanden Wyngaerd, 2011, fn. 3, p.15), similarly to Dowty (1980)'s intuition: the inherently feature valued pronoun could allow for coreference with a local antecedent, but the existence of a more specific form that can achieve this meaning leads to the implicature that the regular pronoun expresses disjoint reference.

Rooryck & vanden Wyngaerd (2011) argue that the reason that 1st and 2nd person pronouns violate Principle B in German, Dutch, Romance, a.o. is because

these languages lack a dedicated form to express reflexive meanings. In German, for instance, the pronoun *ihn* is used for the Accusative 3rd person, while *sich* is the reflexive pronominal form. For 1st and 2nd person, the forms *mich* and *dich* are syncretic: they can express either disjoint or reflexive readings, as shown below.

(158) a. *Ich bewundere* ***mich***.
I admire me
'I admire myself.'

b. *Er bewundert* ***mich***.
he admires me
'He admires me.'

Based on the assumption that regular pronouns may acquire reflexive interpretations in the absence of a specialized reflexive form, Rooryck & vanden Wyngaerd (2011) make the following generalization about cross-linguistic Principle B effects, first observed in Pica (1984) and Burzio (1989, 1991, 1996).

(159) *Absence of Principle B Effects (APBE)*
Pronouns behave like anaphors when a dedicated class of reflexive pronouns is lacking.
(Rooryck & vanden Wyngaerd, 2011, ex. (25), p.19)

Rooryck & vanden Wyngaerd (2011) claim that the *ABPE* generalization can be derived from the *Elsewhere* principle. The lexical insertion process, which occurs post-syntactically, is schematically represented below: an exponent will be spelled-out for a morphological feature bundle in a given environment.

(160) morpheme $\leftrightarrow$ exponent/environment
(Rooryck & vanden Wyngaerd, 2011, ex. (44), p.28)

The proposal is that each language has its own set of ordered lexical insertion rules, the sequence of which is determined by the ϕ-feature specification of the morphological forms available in the given language. A careful reader should be warned, however, that the ordering of these rules is more of an ad-hoc stipulation and does

not straightforwardly fall out from the *Subset Principle* or from the *Elsewhere Principle*, as the authors claim. Rooryck & vanden Wyngaerd (2011) illustrate this mechanism in several Indo-European languages, with a focus on German.

The issue with German

The pronominal inventory of German, as well as the German lexical insertion rules, as proposed by Rooryck & vanden Wyngaerd (2011), are given below.

(161) *German Pronominal System*

German	**Non-Reflexive**			**Reflexive**
	Nominative	*Dative*	*Accusative*	
1SG	ich	mir	***mich***	***mich***
2SG	du	dir	***dich***	***dich***
3SG.MASC	er	ihm	ihn	sich
3SG.FEM	sie	ihr	sie	sich
3SG.NEUT	es	ihm	es	sich
1PL	wir	uns	***uns***	***uns***
2PL	ihr	euch	***euch***	***euch***
3PL	sie	ihnen	sie	sich

(Rooryck & vanden Wyngaerd, 2011, adapted from *Table 2.1*, p.19)

Before we discuss the *ordered* lexical insertion rules that Rooryck & vanden Wyngaerd (2011) advocate for German, given in (162) below, it should be noted that Rooryck & vanden Wyngaerd (2011) operate under the assumption that the pronoun for 3SG.NEUT.DAT, highlighted in the table above, is *es*, which is not consistent with the German data: the dative neuter pronoun is *ihm* (Haider, 2010, p. 238).[4]

[4]Also see online resources such as `https://en.wikibooks.org/wiki/German/Grammar/Pronouns` and `https://study.com/academy/lesson/german-dative-pronouns.html`.

In German, the *ihm* form is syncretic between 3SG.MASC.DAT and 3SG.NEUT.DAT, since *ihm* can refer to both masculine and neuter referents. Contrary to fact, Rooryck & vanden Wyngaerd (2011) assume that *es* is syncretic for nominative, dative and accusative neuter referents. Consequently, the lexical insertion rules they propose *do not* capture the actual German pronominal system. The rules affected by this empirical oversight are bolded in (162) below.

(162) *German Lexical Insertion Rules*

a.	{P: 1, N:SG}	↔	*ich* / __ nominative case
b.	{P: 1(*), N:SG(*)}	↔	*mir* / __ dative case
c.	{P: 1(*), N:SG(*)}	↔	*mich* / __ accusative case
d.	{P: 2, N:SG}	↔	*du* / __ nominative case
e.	{P: 2(*), N:SG(*)}	↔	*dir* / __ dative case
f.	{P: 2(*), N:SG(*)}	↔	*dich* / __ accusative case
g.	{P: 1, N:PL}	↔	*wir* / __ nominative case
h.	{P: 1(*), N:PL(*)}	↔	*uns* / __ accusative case
i.	{P: 2(*), N:PL(*)}	↔	*euch* / __ accusative case
j.	{P:3*}	↔	*sich*
k.	{P: 3, N:SG, G:M}	↔	*er* / __ nominative case
l.	{P: 3, N:SG, G:M}	↔	*ihn* / __ accusative case
m.	**{P: 3, N:SG, G:M}**	↔	***ihm* / __ dative case**
n.	{P: 3, N:PL}	↔	*ihnen* / __ dative case
o.	**{P: 3, N:SG, G:N}**	↔	***es***
p.	**{P: 3}**	↔	***sie***
q.	**elsewhere**	↔	***ihr***

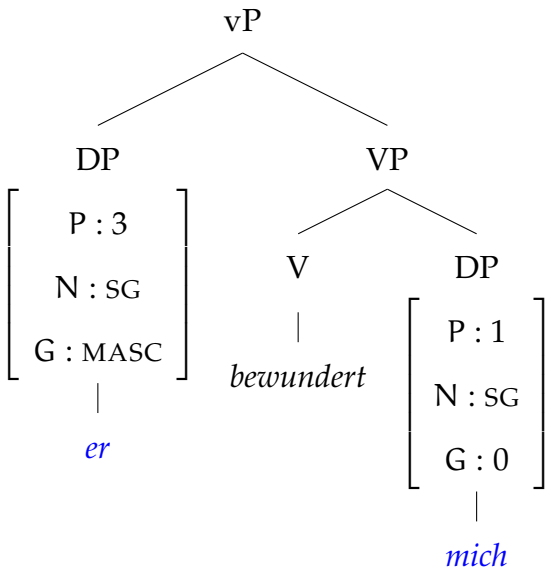
(Rooryck & vanden Wyngaerd, 2011, ex. (46), p.31)

With respect to 1st and 2nd person pronouns, Rooryck & vanden Wyngaerd (2011)

assume that they are underspecified for gender, which is why the lexical insertion rules do not include a value for the gender feature of 1st and 2nd person pronouns; for instance, *mich* is inserted for {P: 1(*), N:SG(*)}, while *ihn* is also specified for gender ({P: 3, N:SG, G:M}). Furthermore, in order for the lexical insertion system to converge, Rooryck & vanden Wyngaerd (2011) add the stipulation that the gender value for referential 1st and 2nd person pronouns is 0, as opposed to masculine, feminine or neuter. Lastly, given that object 1st and 2nd person pronouns can express both coreference and disjoint reference, the entries for *mir, mich, dir, dich, uns* and *euch* in (162) have optionally starred features, encoded through (*), to indicate that the same form can be used for both bound and referential pronouns.

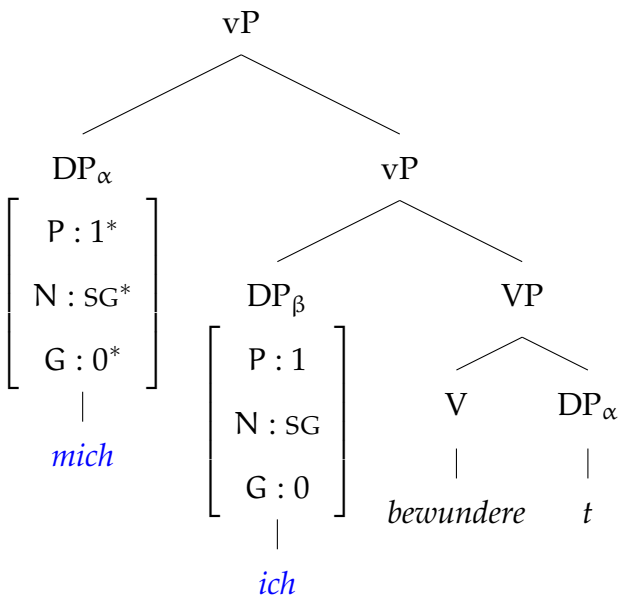
In a sentence like *Er bewundert mich* 'He admires me', the derivation for which is given in (163), there are two referential pronouns: the 3rd person subject and the 1st person object. These pronouns enter the derivation with inherently valued features, which, in this case, are {P: 3, N:SG, G:MASC} and {P: 1, N:SG, G:0}, respectively. Given that the derivation includes no minimal pronouns, an AGREE relation is not required, and Spell-Out can proceed.

(163) Referential *mich*



The lexical insertion process starts with the first rule in (162), and compares the rule's specifications for morphological features and environment to the DP in the derivation. As for the object pronoun, according to the rules above, there is no pronominal form specified for the 0 gender value, so the pronoun that best matches the {P: 1, N:SG} set of features is inserted. The enivronments for the first two rules, namely *nominative case* and *dative case*, do not match the case of the object DP, which is accusative. Consequently, the (c) rule in (162) is applied, and *mich* is inserted. The same reasoning is employed in the case of the subject DP. The feature bundle in the subject position is {P: 3, N:SG, G:MASC}, which firstly leads to the elimination of all the rules specified for other persons. Given that the pronoun in the subject position is not bound, none of its features are starred, so the insertion of *sich*, namely rule (j), is blocked. Finally, the (k) rule matches both the features of the DP as well as the case environment (nominative), so *er* is inserted.

(164) Bound *mich*



In the case of a sentence like *Ich bewundere mich* 'I admire myself', the derivation for which is given in (164) above, the reflexive enters the derivation with unvalued features: {P:_, N:_, G:_}. In order to get its features valued, the reflexive DP moves

covertly, AGREEs with the subject DP and shares features. As a result of being valued via feature sharing, the features of DP_{α} are starred: {P: 1*, N: SG*, G: 0*}. The feature specifications of the subject DP in (164) correspond to the first entry in the set of lexical insertion rules for German, {P: 1, N:SG} in a nominative context, so *ich* is inserted under DP_{β}. As for DP_{α}, having agreed with the subject position, it requires a morphological form which is specified for {P: 1*, N: SG*, G: 0*} and can be found in an accusative environment, namely *mich*. In Rooryck & vanden Wyngaerd (2011)'s system, since *mich* is not specified for whether it is reflexive or nonreflexive, it can be inserted in both kinds of contexts.

(165) *Predicted German Paradigm*

German	**Non-Reflexive**			**Reflexive**
	Nominative	*Dative*	*Accusative*	
1SG	ich	mir	mich	mich
2SG	du	dir	dich	dich
3SG.MASC	er	ihm	ihn	sich
3SG.FEM	sie	SIE	sie	sich
3SG.NEUT	es	ES	es	sich
1PL	wir	IHR	uns	uns
2PL	ihr	IHR	euch	euch
3PL	sie	ihnen	sie	sich

Indeed, the set of rules spelled out in (162) can capture the syncretism of German 1st and 2nd person singular pronouns between bound and disjoint contexts. However, this system fails to account for the distribution of other expressions, including: the dative forms of 1st and 2nd plural pronouns *uns*, *euch*, the dative 3.SG.FEM *ihr*, the 3.SG.NEUT *es*, as well as the syncretic 3rd person pronoun *sie*. To portray the discrepancies between the predictions of the Rooryck & vanden Wyngaerd (2011) account and the concrete distribution of these pronouns, the table

below provides the paradigm generated by the lexical insertion rules in (162). The unmet predicted forms are highlighted.

(166) *Revised German Lexical Insertion Rules*

a.	{P: 1, N:SG}	↔	*ich* / __ nominative case
b.	{P: 1(*), N:SG(*)}	↔	*mir* / __ dative case
c.	{P: 1(*), N:SG(*)}	↔	*mich* / __ accusative case
d.	{P: 2, N:SG}	↔	*du* / __ nominative case
e.	{P: 2(*), N:SG(*)}	↔	*dir* / __ dative case
f.	{P: 2(*), N:SG(*)}	↔	*dich* / __ accusative case
g.	{P: 1, N:PL}	↔	*wir* / __ nominative case
h.	**{P: 1(*), N:PL(*)}**	↔	***uns***
i.	**{P: 2(*), N:PL(*)}**	↔	***ihr / __ nominative case***
j.	**{P: 2(*), N:PL(*)}**	↔	***euch***
k.	{P:3*}	↔	*sich*
l.	{P: 3, N:SG, G:M}	↔	*er* / __ nominative case
m.	{P: 3, N:SG, G:M}	↔	*ihn* / __ accusative case
n.	**{P: 3, N:SG, G:F}**	↔	***ihr / __ dative case***
o.	{P: 3, N:PL}	↔	*ihnen* / __ dative case
p.	**{P: 3, N:SG}**	↔	***ihm / __ dative case***
q.	**{P: 3, N:SG, G:N}**	↔	***es***
r.	**elsewhere**	↔	***sie***

As observed above, other than the incorrect assumption that the Dative 3SG.NEUT form is *es*, Rooryck & vanden Wyngaerd (2011) also fail to capture the syncretism of *uns* and *euch* for 2ND.PL accusative and dative, and the syncretism of *ihr* for 3SG.FEM dative and 2PL nominative. In order to fully capture the German pronominal paradigm, the most straightforward solution is that of allowing two separate

rules for *ihr* and revising the environments of the other morphological forms. The changes to the Rooryck & vanden Wyngaerd (2011) proposal are highlighted.

By providing specified lexical insertion rules for *ihr*, the *elsewhere* form becomes *sie* (as opposed to *ihr* in Rooryck & vanden Wyngaerd (2011)), which is syncretic between the nominative and accusative exponents of 3SG.FEM and 3PL. This new state of affairs also reflects that *sie* is the most frequent form in the German paradigm, after the pronouns which also function as reflexives: *mich, dich, uns, euch, sich*.

(167) *Comparison: Rooryck & vanden Wyngaerd (2011) (RvG) vs. Revised Rules*

a. **{P: 3, N:SG, G:F}, Dative**

i. RvG: ***sie*** **X**
{P: 3} ↔ *sie*

ii. *Revised Rules*: ***ihr*** ✓
{P: 3, N:SG, G:F} ↔ *ihr* __ *dative case*

b. **{P: 3, N:SG, G:NEUT}, Dative**

i. RvG: ***es*** **X**
{P: 3, N:SG, G:N} ↔ *es*

ii. *Revised Rules*: ***ihm*** ✓
{P: 3, N:SG} ↔ *ihm* __ *dative case*

c. **{P: 1, N:PL}, Dative**

i. RvG: ***ihr*** **X**
elsewhere ↔ *ihr*

ii. *Revised Rules*: ***uns*** ✓
{P: 1(*), N:PL(*)}, ↔ *uns*

d. **{P: 2, N:PL}, Dative**

i. RvG: ***ihr*** **X**
elsewhere ↔ *ihr*

ii. *Revised Rules*: ***euch*** ✓
{P: 2(*), N:PL(*)} ↔ *euch*

The Rooryck & vanden Wyngaerd (2011) account and the rules I propose in (166) differ in terms of the steps taken in the insertion of a given morphological form, but only lead to different empirical results for the dative forms of 3SG.FEM, 3SG.NEUT, 1PL and 2PL, as shown in (167) above, which lists the lexical insertion rules employed for each feature bundle according to the two different accounts. For instance, for 3.SG.FEM.DAT, in the Rooryck & vanden Wyngaerd (2011) system, the first rule that matches a subset of the {P: 3, N:SG, G:F} feature bundle is rule {P: 3} $\leftrightarrow$ *sie*, and hence *sie* is inserted. In my account, however, the only rule that matches {P: 3, N:sg, G:f} is rule (n), {P: 3, N:SG, G:F} $\leftrightarrow$ *ihr* __ *dative case*, which leads to the correct result of *ihr* being inserted for 3.SG.FEM.DAT.

As in Rooryck & vanden Wyngaerd (2011), the reflexive *sich* is ordered above the other 3rd person rules, to ensure that *sich* is inserted for all bound 3rd person forms. This ordering *should* follow from the *Elsewhere Principle* and the *Subset Principle*, but it does not: these principles would render *er* and *ihn* as more specific. In this sense, the ordering of these lexical insertion rules in the Rooryck & vanden Wyngaerd (2011) system is at least partially ad-hoc. Suspending disbelief for a moment, let us see how the competition between *sich* and *ihn* would play out. For instance, for a derivation where the object pronoun is bound by a referential subject, like *Lockhart*, the shared set of features are {P: 3*, N: SG*, G: M*}. The first rule that has a partial feature match with the morphological specifications of the object DP is (k): {P: 3*}; consequently, *sich* is spelled out. On the other hand, in the case of a derivation with a referential object pronoun, whose feature bundle is {P: 3, N: SG, G: M}, for instance, the (k) rule will not be a match, since the 3rd person feature of the object DP is inherent, and not starred. Rule (l) matches the feature bundle, but not the syntactic environment, since the object DP bears accusative case. Consequently, rule (m) is applied and *ihn* is inserted.

As illustrated above, the revised set of lexical insertion rules can capture the

German data, as well as the lack of Principle B effects for pronouns which are syncretic between a reflexive and a non-reflexive form. However, Rooryck & vanden Wyngaerd (2011)'s original system can only capture the distribution of 1st and 2nd person pronouns. Moreover, neither in Rooryck & vanden Wyngaerd (2011) nor in the amended version I propose, the absence of Principle B effects does *not* fall out from the *Elsewhere Principle* and the *Subset Principle*, but from the stipulated ordering of lexical insertion rules.

The issue with French

Rooryck & vanden Wyngaerd (2011) further discuss Dutch, Frisian, and French, but only provide a full account of the latter. As shown below, Italian and French differ in that the 3rd person pronoun can give rise to a reflexive reading in the latter, but not in the former. Like Safir (2004), Rooryck & vanden Wyngaerd (2011) observe that the French reflexive *soi* is restricted to impersonal or quantified antecedents. This state of affairs, according to Safir (2004) and Rooryck & vanden Wyngaerd (2011) allows for the regular pronoun *lui* to express coreference with a local antecedent when *lui* is a PP object, given that there is no dedicated reflexive in this syntactic environment.

(168) a. ***Victor*** *a honte de *soi/****lui****.* FRENCH
Victor has shame of SELF/him
'Victor is ashamed of himself.'

b. ***Gianni*** *ha vergogna di* ***sé****/*lui.* ITALIAN
Gianni has shame of SELF/him
'Gianni is ashamed of himself.'

(Rooryck & vanden Wyngaerd, 2011, ex. (42b), (43), p.27)

The account provided by Rooryck & vanden Wyngaerd (2011) for French aims to capture the pronominal paradigm in the table below. Like in German, 1st and

2nd person pronouns can achieve both reflexive and non-reflexive interpretations. Unlike German, French has accusative clitic forms, oblique clitics, strong forms, reflexive clitics, strong reflexives, and impersonal reflexive forms.

(169) *French Lexical Insertion Rules*

a.	{P: 1, N:SG}	↔	*je* / __ nominative case
b.	{P: 1(*), N:SG(*)}	↔	*me* / __ clitic
c.	{P: 1(*), N:SG(*)}	↔	*moi*
d.	{P: 1(*)}	↔	*nous*
e.	{P: 2, N:SG}	↔	*tu* / __ nominative case
f.	{P: 2(*), N:SG(*)}	↔	*te* / __ clitic
g.	{P: 2(*), N:SG(*)}	↔	*toi*
h.	{P: 2(*)}	↔	*vous*
i.	{P:3*}	↔	*se* / __ clitic
j.	{P:3*}	↔	*soi* / __ quantificational variable
k.	{P: 3, N:SG, G:M}	↔	*il* / __ nominative case
l.	{P: 3, N:SG, G:M}	↔	*le* / __ clitic, accusative case
m.	{P: 3, N:SG, G:F}	↔	*la* / __ clitic, accusative case
n.	{P: 3(*), N:SG(*), G:F(*)}	↔	*elle*
o.	{P: 3(*), N:SG(*)}	↔	*lui*
p.	{P: 3, N:PL, G:M}	↔	*ils* / __ nominative case
q.	{P: 3(*), N:PL(*), G:F(*)}	↔	*elles* / __ nominative case
r.	{P: 3, N:PL}	↔	*leur* / __ clitic, dative case
s.	{P: 3, N:PL}	↔	*les* / __ clitic, accusative case
t.	elsewhere	↔	*eux*

(Rooryck & vanden Wyngaerd, 2011, ex. (55-56), p.37)

(170) *French Pronominal Paradigm*

French	**Non-Reflexive**				**Reflexive**		
	Nom.	*Acc. clitic*	*Obl. clitic*	*strong*	*clitic*	*strong*	*impers.*
1SG	je	me	***me***	***moi***	***me***	***moi***	
2SG	tu	te	***te***	***toi***	***te***	***toi***	
3SG.MASC	il	le	lui		se	lui	soi
3SG.FEM	elle	la	lui	elle	se	elle	soi
1PL	nous	nous	***nous***				
2PL	vous	vous	***vous***				
3PL.MASC	ils	les	leur	eux	se	eux	soi
3PL.FEM	elles	les	leur	eux	se	eux	soi

(Rooryck & vanden Wyngaerd, 2011, adapted from *Table 2.6*, p.36)

There are certain issues with respect to the rules above. For instance, rule (q) lets *elles* 'them.FEM' be able to have a bound variable reading, given the optionally starred features, but the rule in (p), for *ils* 'them.MASC' only spells out *ils* for unbound variables in subject position. However, *ils* can be bound, as shown in (171). According to the rules above, the spell-out form of {P: 3(*), N:PL(*), G:M(*)} would end up being the elsewhere form *eux*, which is contrary to fact.

(171) ***Tous les*** ***couples*** *croient* *qu'* ***ils*** *sont amoureux.*

all the.PL couples believe.3PL that they.MASC are in-love.MASC.PL
'All couples believe they are in love.'

Similarly, according to (169), the clitics *la, le* and *leur* cannot express bound variables. However, these clitics can surface in bound variable positions, as shown in the example below, where the feminine clitic *l'* is interpreted as a different picture for each individual in the set of men referenced by *chaque homme*. In this case, the feature bundle for the bound object pronoun in (172) is {P: 3(*), N:SG(*), G:F(*)}, after having agreed with the feminine *la photo*, and the environment is accusative

clitic. The first rule which matches these specifications is (i), so the reflexive clitic *se* would be spelled-out, which, once again, is contrary to the empirical data.

(172) *La photo de sa fille, chaque homme* ***l'*** *a déchirée.*
the photo of his girl each man FEM.CL.ACC has torn
'The picture of his daughter, each man tore it.'

(Guilliot, 2008, ex. (3), p.2)

Other than the slight discrepancies between the optionally starred feature bundles in (169) and the morphological forms which can express bound variable readings, the system proposed by Rooryck & vanden Wyngaerd (2011) in (169) incorrectly predicts that the clitic form for 3SG.FEM.OBLIQUE is *elle*, when, in fact, it is *lui*. Given that the (n) rule, namely {P: 3(*), N:SG(*), G:F(*)} ↔ *elle*, is ordered above the rule for *lui*, and given that there is no higher rule which can be applied in Oblique clitic contexts, the spell-out form of 3.SG.FEM.CL.OBLIQUE will be *elle*. In this sense, one of the challenges of accounting for the French pronominal paradigm in a distributed morphology account is that *lui* is syncretic between four forms: 3SG.MASC.CL. OBL, 3SG.MASC.STRONG, 3SG.MASC.REFL.STRONG, and 3SG.FEM.CL.OBL. I leave the exercise of ammending the Rooryck & vanden Wyngaerd (2011) so as to accurately predict the French data for future research.

To sum up, the detailed distributed morphology account of Rooryck & vanden Wyngaerd (2011) can successfully capture the absence of Principle B effects for 1st and 2nd person pronouns in French and German, as well as the distribution of 1st and 2nd person pronouns in general. However, the pronominal paradigms for 3rd person are far more complex, and hence harder to account for in a rule-based system. Furthermore, both Safir (2004) and Rooryck & vanden Wyngaerd (2011) assume that complex reflexives, like the emphatic *lui-même*, do not compete with simplex pronouns, which is why their distribution is purpusefully disregarded in the Rooryck & vanden Wyngaerd (2011) account. As illustrated in *Chapter 4*,

however, complex reflexives and regular pronouns do compete, contra Safir (2004) and Rooryck & vanden Wyngaerd (2011).

The issue with Romanian

The system laid out in Rooryck & vanden Wyngaerd (2011) does not capture the German or French data discussed in their proposal, and nor can it be extended to a language like Romanian, the pronominal system of which is repeated in (173).

As shown in (173), the Romanian pronominal system is slightly more complex, with specialized clitic and pronominal forms with respect to person, number and case. Like for French and German, Rooryck & vanden Wyngaerd (2011)'s account can be successfully applied to 1st and 2nd person pronouns in Romanian. The lexical insertion rules proposed in (174) assume that each morphological exponent has its own insertion rule, and that the accusative forms *mine, tine, noi, voi* are the *elsewhere* exponents for each person and number combination.

(173) *Romanian Pronominal Paradigm*

Romanian	**Non-Reflexive**					**Reflexive**	
	Nom.	***Accusative***		***Dative***			
		clitic	*strong*	*clitic*	*strong*	*clitic*	*strong*
1SG	eu	mă	***mine***	***mi***	***mie***	***mă / (î)mi***	mine mie
2SG	tu	te	***tine***	***(î)ţi***	***ţie***	***te/ îţi***	tine / ţie
3SG.MASC	el	îl	el	îi	lui	se/şi	sine sieşi
3SG.FEM	ea	o	ea	îi	ei	se/şi	sine sieşi
1PL	noi	ne	noi	ni	nouă	ne/ni	noi / nouă
2PL	voi	vă	voi	vi	vouă	vă/vi	voi/vouă
3PL.MASC	ei	îi	ei	le	lor	se / şi	sine sieşi
3PL.FEM	ele	le	ele	le	lor	se/ şi	sine sieşi

(174) *Romanian Lexical 1st and 2nd Person Insertion Rules*

a. {P: 1, N:SG} ↔ *eu* / __ nominative case

b. {P: 1(*), N:SG(*)} ↔ *(î)mi* / __ clitic, dative

c. {P: 1(*), N:SG(*)} ↔ *mă* / __ clitic

d. {P: 1(*), N:SG(*)} ↔ *mie* / __ dative case

e. {P: 1(*), N:SG(*)} ↔ *mine*

f. {P: 2, N:SG} ↔ *tu* / __ nominative case

g. {P: 2(*), N:SG(*)} ↔ *(î)ţi* / __ clitic, dative case

h. {P: 2(*), N:SG(*)} ↔ *te* / __ clitic

i. {P: 2(*), N:SG(*)} ↔ *tine*

j. {P: 1(*), N:PL(*)} ↔ *ni* / __ clitic, dative case

k. {P: 1(*), N:PL(*)} ↔ *ne*

l. {P: 1(*), N:PL(*)} ↔ *nouă* / __ dative case

m. {P: 1(*), N:PL(*)} ↔ *noi*

n. {P: 2(*), N:PL(*)} ↔ *vi* / __ clitic, dative case

o. {P: 2(*), N:PL(*)} ↔ *vă*

p. {P: 2(*), N:PL(*)} ↔ *vouă* / __ dative case

q. {P: 2(*), N:PL(*)} ↔ *voi*

Similarly to the issues raised by French and German for Rooryck & vanden Wyngaerd (2011)'s system, the accuracy of lexical insertion rules breaks down for 3rd person pronominals. The set of lexical insertion rules which come closest to predicting the Romanian 3rd person pronominal data are given in (175).

(175) *Romanian Lexical 3rd Person Insertion Rules*

a.	{P:3*}	↔	*(î)şi* / __ clitic, dative case
b.	{P:3*}	↔	*se* / __ clitic
c.	{P:3, N: SG, G:F}	↔	*o* / __ clitic, accusative case
d.	{P: 3, N:SG, G:M}	↔	*(î)l* / __ clitic, accusative case
e.	{P: 3, N:SG}	↔	*(î)i* / __ clitic
f.	{P: 3, N:PL, G:M}	↔	*(î)i* / __ clitic, accusative case
g.	{P: 3, N:PL}	↔	*le*
h.	{P: 3*, N:SG*}	↔	*sine*/ __ accusative case
i.	{P: 3*, N:SG*}	↔	*sieşi*/ __ dative case
j.	{P: 3(*), N:SG(*), G: M(*)}	↔	lui/ __ dative case
k.	{P: 3(*), N:SG(*), G: M(*)}	↔	el
l.	{P: 3(*), N:SG(*), G: F(*)}	↔	ea / __ nominative/accusative case
m.	{P: 3(*), N:PL(*), G: F(*)}	↔	ele / __ nominative/accusative case
n.	{P: 3(*), N:PL(*)}	↔	lor / __ dative/genitive case
o.	elsewhere	↔	*ei*

The most problematic aspect of the rules proposed above is that they fail to capture the lack of complementarity between 3rd person reflexive and non-reflexive pronouns in Romanian. According to Rooryck & vanden Wyngaerd (2011), rule (h.), the rule for *sine*, should take precedence over rule (j.) and (l.), the rules for *el* and *ea*, respectively, since *sine* is a more specialzed form which is necessarily reflexive. However, this ranking would lead to the obligatory insertion of *sine* in all reflexive contexts, although Romanian *el* and *ea* can also express reflexive and bound variable interpretations. Therefore, (175) undergenerates. A similar issue would arise if the rule for *sine* were ranked lower than the rule for *el* and *ea*: *sine* would never be used to express reflexive and bound variable readings. Although, as observed

in *Chapter 3*, *sine* is not very frequent in the language, it is still generated.

In general, a Rooryck & vanden Wyngaerd (2011) type account is not compatible with pronominal systems where complementary distribution is not strictly enforced. Although their problematic proposal for German can be tweaked to capture the distribution of pronouns in this language, the same cannot be done for Romanian.

Lastly, I should perhaps emphasize that this system does not *generate* Principle B Effects or their absence in any of the languages discussed in Rooryck & vanden Wyngaerd (2011). Principle B Effects are more or less hard-wired in 'un-starred' pronominal expressions (forms with inherent ϕ-features) by virtue of their competition with pronominal forms with 'starred' features. It is not clear why the latter should be more specific, or how to account for the ordering of the lexical insertion rules proposed in Rooryck & vanden Wyngaerd (2011).

APPENDIX B

EXPERIMENTAL ITEMS

This appendix includes the list of critical items for all four experiments discussed in this dissertation. The characters were drawn by Tran Bui[5], and are loosely based on Harry Potter characters. Tran also drew the items for *Experiment 1* and *Experiment 3*. The items for *Experiment 2* and *Experiment 4* were constructed in Photoshop by myself.

Experiment 1: Production - Referential Subjects

The items from the first production task in *Chapter 3* are listed below. The first item also includes the experimental pictures. The pictures for all conditions of the 16 critical items, 20 fillers, practice items, instructions, PsychoPy scripts, and data analsyis can be found in the relevant folder at the following OSF Repository link `https://osf.io/p3tmd/`.

Item 1

Context Mismatch:

Acesta este Andrei.

'This is Andrei.'

Aceasta este Irina.

'This is Irina.'

[5]You can see more of Tran's work at `https://www.instagram.com/tranttbui/`

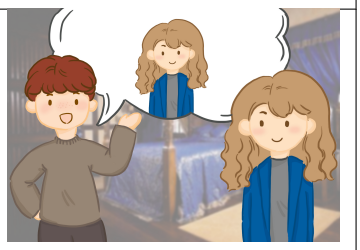
Context Match:

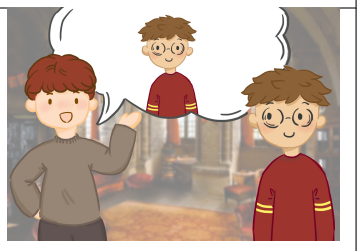
Acesta este Andrei.

'This is Andrei.'

Acesta este Mihai.

'This is Mihai.'

	COREFERENT MISMATCH	DISJOINT MISMATCH
		
MISMATCH SENTENCE	*Acasă la Irina,* ***Andrei*** *a vorbit despre …* home at Irina, Andrei has talked about … 'At Irina's house, Andrei talked about …'	

	COREFERENT MATCH	DISJOINT MATCH
		
MATCH SENTENCE	*Acasă la* ***Mihai****,* ***Andrei*** *a vorbit despre …* home at Mihai, Andrei has talked about … 'At Mihai's house, Andrei talked about … ´	

Item 2

Context: *Acesta este Bogdan. Ace(a)sta este Elena/Daniel*. 'This is Bogdan. This is Elena/Daniel.'

	COREFERENT MISMATCH	DISJOINT MISMATCH
MISMATCH SENTENCE	*La cina Elenei,* ***Bogdan*** *a povestit despre …*	
	at dinner Elena, Bogdan has told-stories about …	
	'At Elena's dinner, Bogdan told stories about …'	

	COREFERENT MATCH	DISJOINT MATCH
MATCH SENTENCE	*La cina lui* ***Daniel****,* ***Bogdan*** *a povestit despre …*	
	at dinner of Daniel Bogdan has told-stories about …	
	'At Daniel's dinner, Bogdan told stories about … ´	

Item 3

Context: *Ace(a)sta este Andrei/Monica. Acesta este Daniel*.

'This is Andrei/Monica. This is Daniel.'

	COREFERENT MISMATCH	DISJOINT MISMATCH
MISMATCH SENTENCE	*La recepția Monicăi,* ***Daniel*** *a trăncănit despre …*	
	at reception Monica, Daniel has jabbered about …	
	'At Monica's reception, Daniel jabbered about …'	

	COREFERENT MATCH	DISJOINT MATCH
MATCH SENTENCE	*La recepția lui* ***Andrei, Daniel*** *a trăncănit despre …*	
	at reception of Andrei Daniel has jabbered about …	
	'At Andrei's reception, Daniel jabbered about … ´	

Item 4

Context: *Ace(a)sta este Anca/Bogdan. Acesta este Mihai.*

'This is Anca/Bogdan. This is Mihai.'

	COREFERENT MISMATCH	DISJOINT MISMATCH
MISMATCH SENTENCE	*La prânzul Ancăi, **Mihai** a minţit despre ...* at luncheon Anca, Mihai has lied about ... 'At Anca's luncheon, Mihai lied about ...'	

	COREFERENT MATCH	DISJOINT MATCH
MATCH SENTENCE	*La prânzul lui **Bogdan, Mihai** a minţit despre ...* at luncheon of Bogdan Mihai has lied about ... 'At Bogdan's luncheon, Mihai lied about ... ´	

Item 5

Context: *Ace(a)sta este Monica / Daniel. Acesta este Andrei.*

'This is Monica/Daniel. This is Andrei.'

	COREFERENT MISMATCH	DISJOINT MISMATCH
MISMATCH SENTENCE	*În bucătăria Monicăi, **Andrei** a gătit pentru ...* in kitchen Monica Andrei has cooked for ... 'In Monica's kitchen, Andrei cooked for ...'	

	COREFERENT MATCH	DISJOINT MATCH
MATCH SENTENCE	*În bucătăria lui **Daniel, Andrei** a gătit pentru ...* in kitchen of Daniel, Andrei has cooked for ... 'In Daniel's kitchen, Andrei cooked for ... ´	

Item 6

Context: *Acesta este Bogdan. Ace(a)sta este Anca / Mihai.*

'This is Bogdan. This is Anca/Mihai .'

	COREFERENT MISMATCH	DISJOINT MISMATCH
MISMATCH SENTENCE	*La reuniunea Ancăi,* ***Bogdan*** *a pălăvrăgit despre …* at reunion Anca Bogdan has chattered about … 'At Anca's reunion, Bogdan chattered about …'	

	COREFERENT MATCH	DISJOINT MATCH
MATCH SENTENCE	*La reuniunea lui* ***Mihai, Bogdan*** *a pălăvrăgit despre …* at reunion of Mihai, Bogdan has chattered about … 'At Mihai's reunion, Bogdan chattered about … ´	

Item 7

Context: *Acesta este Daniel. Ace(a)sta este Bogdan/Irina.*

'This is Daniel. This is Bogdan/Irina.'

	COREFERENT MISMATCH	DISJOINT MISMATCH
MISMATCH SENTENCE	*Pe pagina de Facebook a Irinei,* ***Daniel*** *a scris despre …* on page of Facebook Irina Daniel has written about … 'On Irina's Facebook page, Daniel wrote about …'	

	COREFERENT MATCH	DISJOINT MATCH
MATCH SENTENCE	*Pe pagina de Facebook a lui* ***Bogdan, Daniel*** *a scris despre …* on page of Facebook Bogdan Daniel has written about … 'On Bogdan's Facebook page, Daniel wrote about … ´	

Item 8

Context: *Acesta este Mihai. Ace(a)sta este Elena/Andrei.*

'This is Mihai. This is Elena/Andrei.'

	COREFERENT MISMATCH	DISJOINT MISMATCH
MISMATCH SENTENCE	*La picnicul Elenei,* ***Mihai*** *a glumit despre …* at picnic Elena Mihai has joked about … 'At Elena's picnic, Mihai joked about …'	

	COREFERENT MATCH	DISJOINT MATCH
MATCH SENTENCE	*La picnicul lui* ***Andrei, Mihai*** *a glumit despre …* at picnic of Andrei Mihai has joked about about … 'At Andrei's picnic, Mihai joked about … ´	

Item 9

Context: *Aceasta este Anca. Ace(a)sta este Andrei/Irina.*

'This is Anca. This is Andrei/Irina.'

	COREFERENT MISMATCH	DISJOINT MISMATCH
MISMATCH SENTENCE	*La aniversarea lui Andrei,* ***Anca*** *a hodorogit despre …* at anniversary of Andrei Anca has yapped about … 'At Andrei's anniversary, Anca yapped about …'	

	COREFERENT MATCH	DISJOINT MATCH
MATCH SENTENCE	*La aniversarea* ***Irinei, Anca*** *a hodorogit despre …* at anniversary Irina Anca has yapped about … 'At Irina's anniversary, Anca yapped about … ´	

Item 10

Context: *Ace(a)sta este Monica/Daniel. Aceasta este Elena.*

'This is Monica/Daniel. This is Elena.'

	COREFERENT MISMATCH	DISJOINT MISMATCH
MISMATCH SENTENCE	*În sufrageria lui Daniel, **Elena** a îndrugat despre …*	
	in living-room of Daniel Elena has gone-on-and-on about …	
	'In Daniel's living room, Elena went on and on about …'	

	COREFERENT MATCH	DISJOINT MATCH
MATCH SENTENCE	*În sufrageria **Monicăi, Elena** a îndrugat despre …*	
	in living-room Monica Elena has gone-on-and-on about …	
	'In Monica's living room, Elena went on and on about … ´	

Item 11

Context: *Aceasta este Irina. Ace(a)sta este Bogdan/Anca.*

'This is Irina. This is Bogdan/Anca.'

	COREFERENT MISMATCH	DISJOINT MISMATCH
MISMATCH SENTENCE	*La școala lui Bogdan, **Irina** a troncănit despre …*	
	at school of Bogdan Irina has jabbered about …	
	'At Bogdan's school, Irina jabbered about …'	

	COREFERENT MATCH	DISJOINT MATCH
MATCH SENTENCE	*La școala **Ancăi, Irina** a troncănit despre …*	
	at school Anca Irina has jabbered about …	
	'At Anca's school, Irina jabbered about … ´	

Item 12

Context: *Aceasta este Monica. Ace(a)sta este Mihai/Elena.*

'This is Monica. This is Mihai/Elena.'

	COREFERENT MISMATCH	DISJOINT MISMATCH
MISMATCH SENTENCE	*La majoratul lui Mihai,* ***Monica*** *a debitat despre …*	
	at 18th-birthday of Mihai Monica has chattered about …	
	'At Mihai's 18th birthday, Monica chattered about …'	

	COREFERENT MATCH	DISJOINT MATCH
MATCH SENTENCE	*La majoratul* ***Elenei, Monica*** *a debitat despre …*	
	at 18th-birthday Elena Monica has chattered about …	
	'At Elena's 18th birthday, Monica chattered about … ´	

Item 13

Context: *Ace(a)sta este Daniel/Monica. Aceasta este Anca.*

'This is Danel/Monica. This is Anca.'

	COREFERENT MISMATCH	DISJOINT MISMATCH
MISMATCH SENTENCE	*După serata lui Daniel* ***Anca*** *a visat despre …*	
	after soirée of Daniel Anca has dreamed about …	
	'After Daniel's soirée, Anca dreamed about …'	

	COREFERENT MATCH	DISJOINT MATCH
MATCH SENTENCE	*După serata* ***Monicăi, Anca*** *a visat despre …*	
	after soirée Monica Anca has dreamed about …	
	'After Monica's soirée, Anca dreamed about … ´	

Item 14

Context: *Aceasta este Elena. Ace(a)sta este Andrei/Anca.*

'This is Elena. This is Andrei/Anca.'

	COREFERENT MISMATCH	DISJOINT MISMATCH
MISMATCH SENTENCE	*La petrecerea lui Andrei,* ***Elena*** *s-a gândit la …* at party of Andrei Elena has thought about … 'At Andrei's party, Elena thought about …'	

	COREFERENT MATCH	DISJOINT MATCH
MATCH SENTENCE	*La petrecerea* ***Ancăi, Elena*** *s-a gândit la …* at party Anca Elena has thought about … 'At Anca's party, Elena thought about … ´	

Item 15

Context: *Ace(a)sta este Mihai/Elena. Aceasta este Irina.*

'This is Mihai/Elena. This is Irina.'

	COREFERENT MISMATCH	DISJOINT MISMATCH
MISMATCH SENTENCE	*În jurnalul lui Mihai,* ***Irina*** *a citit despre …* in diary of Mihai Irina has read about … 'In Mihai's diary, Irina read about …'	

	COREFERENT MATCH	DISJOINT MATCH
MATCH SENTENCE	*În jurnalul* ***Elenei, Irina*** *a citit despre …* in diary Elena Irina has read about… 'In Elena's diary, Irina read about … ´	

Item 16

Context: *Aceasta este Monica. Ace(a)sta este Bogdan/Irina.*

'This is Monica. This is Bogdan/Irina.'

	COREFERENT MISMATCH	DISJOINT MISMATCH
MISMATCH SENTENCE	*La ziua lui Bogdan,* ***Monica*** *a râs de …*	
	at birthday of Bogdan Monica has laughed at …	
	'At Bogdan's birthday, Monica laughed at …'	

	COREFERENT MATCH	DISJOINT MATCH
MATCH SENTENCE	*La ziua* ***Irinei, Monica*** *a râs de …*	
	at birthday Irina Monica has laughed at…	
	'At Irina's birthday, Monica laughed at … ´	

Filler Items

Context: *Acesta este Mihai. Mihai era la el acasă.*'This is Mihai. Mihai was at his house.'
Sentence: *Mihai și-a imaginat…* 'Mihai imagined...'

Context: *Aceasta este Anca. Anca era la ea acasă.* 'This is Anca. Anca was at her house.'
Sentence: *Anca a visat despre…* 'Anca dreamed about ...'

Context: *Aceasta este Irina. Irina vorbea la telefon.*'This is Irina. Irina was talking on the phone.'
Sentence: *Irina a discutat despre…* 'Irina discussed about ...'

Context: *Acesta este Andrei. Andrei vorbea la telefon.* 'This is Andrei. Andrei was talking on the phone.'
Sentence: *Andrei a auzit despre…*'Andrei heard about ...'

Context: *Acesta este Bogdan. Bogdan vorbea la telefon.* 'This is Bogdan. Bogdan was talking on the phone.'
Sentence: *Bogdan s-a plâns despre…* 'Bogdan complained about...'

Context: *Acesta este Daniel. Daniel s-a dus la bibliotecă.* 'This is Daniel. Daniel went to the library.'
Sentence: *Daniel a studiat despre…* 'Daniel studied about...'

Context: *Aceasta este Monica. Monica era în camera ei.* 'This is Monica. Monica was in her room.'
Sentence: *Monica este interesată de …* 'Monica is interested in ...'

Context: *Aceasta este Elena. Elena era singură.* 'This is Elena. Elena was alone.'
Sentence: *Elenei îi e frică de …* 'Elena is scared of ...'

Context: *Aceasta este Anca. Ancăi îi plac multe lucruri, dar . . .* 'This is Anca. Anca likes many things, but....'
Sentence: *Anca urăște ...* 'Anca hates...'

Context: *Acesta este Andrei. Lui Andrei îi plac multe lucruri. De exemplu . . .* 'This is Andrei. Andrei likes many things. For instance ....'
Sentence: *Andrei iubește ...* 'Andrei loves ...'

Context: *Acesta este Mihai. Mihai și-a primit rezultatele la examen.* 'This is Mihai. Mihai got his exam results.'
Sentence: *Mihai este mândru de ...* 'Mihai is proud of ...'

Context: *Aceasta este Anca. Anca nu a primit locul de muncă dorit.* 'This is Anca. Anca did not get the job she wanted.'
Sentence: *Anca este dezamăgită de ...* 'Anca is disappointed in ...'

Context: *Aceasta este Irina. Irina crede că a rezolvat destule azi. .* 'This is Irina. Irina thinks she got a lot done today.'
Sentence: *Irina este mulțumită de ...* 'Irina is content with...'

Context: *Aceasta este Monica. Monica crede că putea să se descurce mai bine la examen.* 'This is Monica. Monica thinks she could have done better on the exam. '
Sentence: *Monica este furioasă pe ...* 'Monica is furious with...'

Context: *Acesta este Andrei. Andrei s-a dus la plajă.* 'This is Andrei. Andrei went to the beach.'
Sentence: *Acum, ...* 'Now, ...'

Context: *Acesta este Daniel. Daniel s-a îmbrăcat prea subțire.* 'This is Daniel. Daniel isn't dressed properly. '
Sentence: *Acum, ...* 'Now, ...'

Context: *Acesta este Bogdan. Bogdan e cam arogant.* 'This is Bogdan. Bogdan is a bit arrogant.'
Sentence: *Bogdan este îndrăgostit de ...* 'Bogdan is in love with ...'

Context: *Aceasta este Elena. Elena nu a rezolvat tot ce voia.* 'This is Elena. Elena did not accomplish everything she wanted to.'
Sentence: *Elena este nemulțumită de ...* 'Elena is unhappy with ...'

Context: *Aceasta este Anca. Anca a luat premiul întâi la un concurs.* 'This is Anca. Anca got first prize in a competition.'
Sentence: *Anca este încântată de ...* 'Anca is pleased with ...'

Context: *Aceasta este Monica. Monica a băut prea mult aseară..* 'This is Monica. Monica had too much to drink last night. '
Sentence: *Monica este supărată pe ...* 'Monica is mad at ...'

Experiment 2: Production - Quantified Subjects

The items from the second production task in *Chapter 3* are listed below. The first item also includes the experimental pictures. The pictures for all conditions of the 16 critical items, 20 fillers, practice items, instructions, PsychoPy scripts, and data analsyis can be found in the relevant folder at the following OSF Repository link `https://osf.io/p3tmd/`.

Item 1

Context: *Bunica Maria / Bunicul Paul a fost vizitat(ă) recent de către familie. Andrei, Daniel și Mihai au fost și ei prezenți.*
'Grandma Maria / Grandpa Paul was recently visited by family. Andrei, Daniel and Mihai were there too.'

	BOUND MISMATCH	DISJOINT MISMATCH
		
MISMATCH SENTENCE	*Acasă la bunica Maria, **fiecare băiat** a vorbit despre ...* home at grandma Maria, every boy has talked about ... 'At Grandma Maria's house, every boy talked about ...'	

	BOUND MATCH	DISJOINT MATCH
		
MATCH SENTENCE	*Acasă la **bunicul Paul**, **fiecare băiat** a vorbit despre ...* home at grandpa Paul, every boy has talked about ... 'At Grandpa Paul's house, every boy talked about ... ´	

Item 2

Context: *Bunica Laura / Bunicul Radu a gătit aseară. Dintre meseni fac parte și nepoții Mihai, Daniel și Andrei.*

'Grandma Laura / Grandpa Radu cooked last night. Part of the guests are also grandsons Mihai, Daniel and Andrei.'

	BOUND MISMATCH	DISJOINT MISMATCH
MISMATCH SENTENCE	*La cina <u>bunicii Laura</u>, **fiecare nepot** a povestit despre …*	
	at dinner grandma Laura, every grandson has told-stories about …	
	'At Grandma Laura's dinner, every grandson told stories about …'	

	BOUND MATCH	DISJOINT MATCH
MATCH SENTENCE	*La cina **bunicului Radu**, **fiecare nepot** a povestit despre …*	
	at dinner grandpa Radu, every grandson has told-stories about …	
	'At Grandpa Radu"s dinner, every grandson told stories about … ´	

Item 3

Context: *Mătuşa Diana / Unchiul Vlad a avut o recepție aseară. Andrei, Mihai și Daniel au mers și ei.*

'Aunt Diana / Uncle Vlad had a reception last evening. Andrei, Mihai and Daniel went too. '

	BOUND MISMATCH	DISJOINT MISMATCH
MISMATCH SENTENCE	*La recepţia mătu[şii Diana, **fiecare băiat** a trăncănit despre …* at reception aunt Diana, every boy has chattered about … 'At Aunt Diana's reception, every boy chattered about …'	

	BOUND MATCH	DISJOINT MATCH
MATCH SENTENCE	*La recepţia unchiului Vlad, **fiecare băiat** a trăncănit despre …* at reception uncle Vlad, every boy has chattered about … 'At Uncle Vlad's reception, every boy chattered about … ´	

Item 4

Context: *Mătușa Raluca / Unchiul George și-a invitat familia la masă. Daniel, Andrei și Mihai au fost acolo.*

'Aunt Raluca / Uncle George invited her/his family to lunch. Daniel, Andrei and Mihai were there.'

	BOUND MISMATCH	DISJOINT MISMATCH
MISMATCH SENTENCE	*La prânzul mătuşii Raluca, **fiecare nepot** a minţit despre …* at lunch aunt Raluca, every nephew has lied about … 'At Aunt Raluca's luncheon, every nephew lied about …'	

	BOUND MATCH	DISJOINT MATCH
MATCH SENTENCE	*La prânzul unchiului George, **fiecare nepot** a minţit despre …* at lunch uncle George, every nephew has lied about … 'At Uncle George's luncheon, every nephew lied about … ´	

Item 5

Context: *Mătușa Raluca / Bunicul Radu și-a primit nepoții la ea / el ziua trecută. Mihai, Andrei și Daniel s-au dus împreună.*

'Aunt Raluca / Grandpa Radu had her / his nephews/ grandsons over the other day. Mihai, Andrei and Daniel went together.'

	BOUND MISMATCH	DISJOINT MISMATCH
MISMATCH SENTENCE	*În bucătăria mătuşii Raluca,* ***fiecare băiat*** *a gătit pentru …* in kitchen aunt Raluca, every boy has cooked for … 'In Aunt Raluca's kitchen, every boy cooked for …'	

	BOUND MATCH	DISJOINT MATCH
MATCH SENTENCE	*În bucătăria bunicului Radu,* ***fiecare băiat*** *a gătit pentru …* in grandpa Radu's kitchen, every boy has cooked for … 'In Grandpa Radu's kitchen, every boy cooked for … ´	

Item 6

Context: *Bunica Maria / Unchiul Vlad a organizat o reuniune de familie. Au fost prezenți și Daniel, Mihai și Andrei.*

'Grandma Maria / Uncle Vlad organized a family reunion. Daniel, Mihai and Andrei were also present.'

	BOUND MISMATCH	DISJOINT MISMATCH
MISMATCH SENTENCE	*La reuniunea <u>bunicii Maria</u>, **fiecare nepot** a sporovăit despre …* at reunion grandma Maria, every nephew has yapped about … 'At Grandma Maria's reunion, every nephew yapped about …'	

	BOUND MATCH	DISJOINT MATCH
MATCH SENTENCE	*La reuniunea <u>unchiului Vlad</u>, **fiecare nepot** a sporovăit despre …* at uncle Vlad's reunion, every nephew has yapped about … 'At Uncle Vlad's reunion, every nephew yapped about … ´	

Item 7

Context: *Bunica Laura / Unchiul George își cheamă des nepoții acasă. Andrei, Daniel și Mihai s-au dus chiar astăzi.*

'Grandma Laura / Uncle George invites her grandsons / his nephews over often. Andrei, Daniel and Mihai went by even today.'

	BOUND MISMATCH	DISJOINT MISMATCH
MISMATCH SENTENCE	*În vizită la <u>bunica Laura</u>, **fiecare băiat** a balivernat despre …* in visit at grandma Laura, every boy has tattled about … 'During the visit to Grandma Laura, every boy tattled about …'	

	BOUND MATCH	DISJOINT MATCH
MATCH SENTENCE	*În vizită la <u>unchiul George</u>, **fiecare băiat** a balivernat despre …* in visit at uncle George, every boy has tattled about … 'During the visit to Uncle George, every boy tattled about … ´	

Item 8

Context: *Mătușa Diana / Bunicul Paul a organizat un picnic weekendul trecut. Daniel, Andrei și Mihai au mers cu drag.*

'Aunt Diana / Grandpa Paul organized a picnic last weekend. Daniel, Andrei and Mihai went gladly.'

	BOUND MISMATCH	DISJOINT MISMATCH
MISMATCH SENTENCE	*La picnicul mătuşii Diana, **fiecare nepot** a glumit despre …* at picnic aunt Diana, every nephew has joked about … 'At Aunt Diana's picnic, every nephew joked about …'	

	BOUND MATCH	DISJOINT MATCH
MATCH SENTENCE	*La picnicul bunicului Paul, **fiecare nepot** a glumit despre …* at picnic grandpa Paul, every grandson has joked about … 'At Grandpa Paul's picnic, every grandson joked about … ´	

Item 9

Context: *Bunicul Paul / Bunica Laura doar ce a împlinit 75 / 70 de ani. Monica, Elena și Irina s-au dus și ele să îl / o vadă.*

'Grandpa Paul / Grandma Laura just turned 75 / 70. Monica, Elena and Irina also went to see him / her.'

	BOUND MISMATCH	DISJOINT MISMATCH
MISMATCH SENTENCE	*La aniversarea <u>bunicului Paul</u>, **fiecare fată** a hodorogit despre …*	
	at anniversary grandpa Paul, every girl has yapped about …	
	'At Grandpa Paul's anniversary, every girl yapped about …'	

	BOUND MATCH	DISJOINT MATCH
MATCH SENTENCE	*La aniversarea **bunicii Laura**, **fiecare fată** a hodorogit despre …*	
	at anniversary grandma Laura, every girl has yapped about …	
	'At Grandma Laura's anniversary, every girl yapped about … ´	

Item 10

Context: *Bunicul Radu / Bunica Maria a fost vizitat(ă) recent de familie. Elena, Irina și Monica au mers la el / ea ieri.*

'Grandpa Radu / Grandma Maria was recently visited by family. Elena, Irina and Monica went by yesterday.'

	BOUND MISMATCH	DISJOINT MISMATCH
MISMATCH SENTENCE	*În sufrageria <u>bunicului Radu</u>, **fiecare nepoată** a debitat despre …*	
	home at grandpa Radu, every g-daughter has jabbered about …	
	'In Grandpa Radu's living room, every g-daughter jabbered about …'	

	BOUND MATCH	DISJOINT MATCH
MATCH SENTENCE	*În sufrageria **bunicii Laura**, **fiecare nepoată** a debitat despre …*	
	in living-room grandma Laura, every g-daughter has jabbered about …	
	'In Grandma Laura's living room, every g-daughter jabbered about … ´	

Item 11

Context: *Unchiul George / Mătușa Diana își sărbătorește onomastica în iunie. Anul trecut, Irina, Monica și Elena se duseseră să îl / o felicite.*

'Uncle George / Aunt Diana celebrates his / her name day in June. Last year, Irina, Monica and Elena went t congratulate him/her.'

	BOUND MISMATCH	DISJOINT MISMATCH
MISMATCH SENTENCE	*De onomastica unchiului George, **fiecare fată** a troncănit despre …*	
	of name-day uncle George, every girl has yapped about …	
	'During Uncle George's name day, every girl yapped about …'	

	BOUND MATCH	DISJOINT MATCH
MATCH SENTENCE	*De onomastica **mătușii Diana**, **fiecare fată** a troncănit despre …*	
	of name-day aunt Diana, every girl has yapped about …	
	'During Aunt Diana's name day, every girl yapped about … ´	

Item 12

Context: *Unchiul Vlad / Mătușa Raluca a dat o petrecere săptămâna trecută. Irina, Elena și Monica au fost și ele invitate.*

'Uncle Vlad / Aunt Raluca hosted a party last week. Irina, Elena and Monica were invited as well.'

	BOUND MISMATCH	DISJOINT MISMATCH
MISMATCH SENTENCE	*La petrecerea unchiului Vlad, **fiecare nepoată** a îndrugat despre …*	
	at party uncle Vlad, every girl has went-on-and-on about …	
	'At Uncle Vlad's party, every girl went on and on about …'	

	BOUND MATCH	DISJOINT MATCH
MATCH SENTENCE	*La petrecerea mătușii Raluca, **fiecare nepoată** a îndrugat despre …*	
	at party aunt Raluca, every girl has went-on-and-on about …	
	'At Aunt Raluca's party, every girl went on and on about … ´	

Item 13

Context: *Unchiul Vlad / Bunica Laura a ținut o serată la un restaurant scump. Elena, Monica și Irina s-au bucurat să meargă.*

'Uncle Vlad / Grandma Laura hosted a soirée at an expensive restaurant. Elena, Monica and Irina were happy to be there.'

	BOUND MISMATCH	DISJOINT MISMATCH
MISMATCH SENTENCE	*La serata unchiului Vlad, **fiecare fată** s-a gândit la …*	
	at soirée uncle Vlad, every girl has thought about …	
	'At Uncle Vlad's soirée, every girl thought about …'	

	BOUND MATCH	DISJOINT MATCH
MATCH SENTENCE	*La serata bunicii Laura, **fiecare fată** s-a gândit la …*	
	at soirée grandma Laura, every girl has thought about …	
	'At Grandma Laura's soirée, every girl thought about … ´	

Item 14

Context: *Unchiul George / Bunica Maria are o casă frumoasă. Monica, Irina și Elena au dorit să îi vadă biroul.*

'Uncle George / Grandma Maria has a beautiful house. Monica, Irina and Elena wanted to see his / her office.'

	BOUND MISMATCH	DISJOINT MISMATCH
MISMATCH SENTENCE	*În biroul unchiului George, **fiecare nepoată** a discutat despre …* in office uncle George, every niece has discussed about … 'In Uncle George's office, every niece discussed about …'	

	BOUND MATCH	DISJOINT MATCH
MATCH SENTENCE	*În biroul bunicii Maria, **fiecare nepoată** a discutat despre …* in office grandma Maria, every granddaughter has discussed about … 'In Grandma Maria's office, every granddaughter discussed about … ´	

Item 15

Context: *Bunicul Radu / Mătușa Diana are o grădină superbă. Irinei, Elenei și Monicăi le place să stea acolo.*

'Grandpa Radu / Aunt Diana has a superb garden. Irina, Elena and Monica love being there.'

	BOUND MISMATCH	DISJOINT MISMATCH
MISMATCH SENTENCE	*În grădina <u>bunicului Radu</u>, **fiecare fată** a istorisit despre …*	
	in garden grandpa Radu, every girl has told-stories about …	
	'In Grandpa Radu's garden, every girl told stories about …'	

	BOUND MATCH	DISJOINT MATCH
MATCH SENTENCE	*În grădina **mătușii Diana**, **fiecare fată** a istorisit despre …*	
	in garden aunt Diana, every girl has told-stories about …	
	'In Aunt Diana's garden, every girl told stories about … ´	

Item 16

Context: *Bunicul Paul / Mătușa Raluca și-a serbat ziua de naștere. Irina, Elena și Monica au fost și ele prezente.*

'Grandpa Paul / Aunt Raluca celebrated his / her birthday. Irina, Elena and Monica were also present.'

	BOUND MISMATCH	DISJOINT MISMATCH
MISMATCH SENTENCE	*La ziua <u>bunicului Paul</u>, **fiecare nepoată** a râs de …*	
	at birthday grandpa Paul, every granddaughter has laughed at …	
	'At Grandpa Paul's birthday, every granddaughter laughed at …'	

	BOUND MATCH	DISJOINT MATCH
MATCH SENTENCE	*La ziua <u>mătușii Raluca</u>, **fiecare nepoată** a râs de …*	
	at birthday aunt Raluca, every niece has laughed at …	
	'At Aunt Raluca's birthday, every niece laughed at … ´	

Filler Items

Context: *Unchiul Vlad a organizat o reuniune de familie. Mihai, Daniel și Elena au ajuns mai devreme să îl ajute.*

'Uncle Vlad organized a family reunion. Mihai, Daniel, and Elena got there earlier to help out.'

Sentence: *Înainte de petrecere, ambii băieți s-au plâns despre...*

'Before the party, both boys complained about...'

Context: *Mătușa Diana și-a scos nepoții la film. Apoi, Andrei, Monica și Irina au mers la ea acasă.*

'Aunt Diana took her nieces and nephews to the movies. Afterwards, Andrei, Monica, and Irina went by for a visit.'

Sentence: *După film, ambele fete erau încântate de...*

'After the movie, both girls were delighted with...'

Context: *Mătușa Raluca s-a dus la serbarea nepoților ei. Mihai, Irina și Elena merg la aceeași școală.*

'Aunt Raluca went to her nieces' and nephews' school festivitiees. Mihai, Irina, and Elena go to the same school.'

Sentence: *La serbare, toți elevii au discutat planurile lor pentru...*

'At the festivities, all of the students discussed their plans for ...'

Context: *Bunica Maria și-a invitat nepoții la ea. Daniel, Monica și Andrei vorbeau despre ceva.*

'Grandma Maria invited her grandchildren over. Daniel, Monica, and Andrei were talking about something.'

Sentence: *Bunica Maria a aflat că unii dintre nepoții ei cântă la ...*

'Grandma Maria found out that some of her grandchildren play the ...'

Context: *Unchiul Vlad era în grădină cu familia lui. Elena, Mihai și Irina discutau despre pasiunile lor.*

'Uncle Vlad was in the garden with his family. Elena, Mihai, and Irina were discussing their hobbies.'

Sentence: *Unchiul Vlad a auzit că ambele lui nepoate iubesc ...*

'Uncle Vlad heard that both his nieces love ...'

Context: *Unchiul George voia idei de cadouri pentru familie. Daniel, Elena și Monica îi sugerau ce și-ar dori.*

'Uncle George wanted ideas for presents for his family. Daniel, Elena, and Monica were suggesting what they might want.'

Sentence: *Unul dintre nepoți i-a spus unchiului George că este interesat de ...*

'One of the nephews told uncle Goerge that they're interested in ...'

Context: *Bunica Laura își încurajează mereu nepoții să învețe lucruri noi. Monica, Daniel și Irina îi spuneau ce au mai studiat.*

'Grandma Laura always encourages her grandchildren to learn new things. Monica, Daniel and Irina were telling her what else they've learned..'

Sentence: *Una dintre nepoate i-a zis bunicii Laura că a învățat...*

'One of the granddaughters told Grandma Laura that she studied ...'

Context: *Bunicul Radu a fost vizitat recent de familie. Mihai, Monica și Irina vorbeau despre examene.*

'Grandpa Radu was visited by his family recently. Mihai, Monica, and Irina were talking about exams.'

Sentence: *Doi dintre nepoții bunicului Radu erau mulțumiți de ...*

'Two of grandpa Radu's grandchildren were happy with ...'

Context: *Bunicul Paul doar ce a împlinit 75 de ani. Andrei, Elena și Daniel au mers și ei să îl vadă.*

'Grandpa Paul recently turned 75. Andrei, Elena, and Daniel also went to see him.'

Sentence: *Doi dintre nepoții bunicului Paul au spus că îl admiră pe ...*

'Two of grandpa Paul's grandchildren said they admire ...'

Context: *Mătușa Raluca are o livadă în afara orașului. Irina, Andrei și Monica merg des acolo.*

'Aunt Raluca has an orchard outside of town. Irina, Andrei, and Monica go their often.'

Sentence: *În livada mătușii Raluca, toți nepoții ei au vorbit despre ...*

'In aunt Raluca's orchard, all of her nieces and nephews talked about ...'

Context: *Mătușa Diana a deschis accidental contul de Facebook al Irinei. Se uita la ce îi mai scrisese lumea pe pagină.*

'Aunt Diana accidentally opened Irina's Facebook account. She was checking what people had been writing on her wall.'

Sentence: *Pe pagina de Facebook a Irinei, Daniel a scris despre...*

'On Irina's Facebook page, Daniel wrote about ...'

Context: *Mihai și Irina erau în camera lui Mihai. Irina i-a descoperit jurnalul.*

'Mihai and Irina were in Mihai's room. Irina found his diary.'

Sentence: *În jurnalul lui Mihai, Irina a citit despre ...*

'In Mihai's diary, Irina read about ...'

Context: *Bunicul Paul și bunica Maria au mers la serbarea Irinei. Monica s-a dus și ea cu ei.*

'Grandpa Paul and Grandma Maria went to Irina's school celebration. Monica went there, too.'

Sentence: *La școala Irinei, Monica a spus lucruri frumoase despre ...*

'At Irina's school, Monica said nice things about ...'

Context: *S-a deschis o nouă casă de groază. Monica, Daniel și Elena au mers și ei.*

'A new haunted house opened. Monica, Daniel, and Elena went there too.'

Sentence: *În casa de groază, unul dintre copii a spus că îi e frică de...*

'In the haunted house, one of the kids said they're afraid of ...'

Context: *Bunicul Paul și-a invitat nepoții în biblioteca lui. Irina, Daniel și Andrei s-au bucurat să se ducă.*

'Grandpa Paul invited his grandchildren to his library. Irina, Daniel, and Andrei were glad to go.'

Sentence: *În biblioteca bunicului Paul, toți copiii au citit despre ...*

'In grandpa Paul's library, all of the children read about ...'

Context: *Mihai, Monica și Andrei sunt la școală. Doar ce au aflat rezultatele de la un test.*

'Mihai, Monica, and Andrei are at school. They just found out about their test results.'

Sentence: *Examenul a fost foarte dificil, dar acum Mihai este mândru de...*

'The exam was really hard, but now Mihai is proud of ...'

Context: *Bunica Laura își cheamă des nepoții acasă. Daniel și Monica au dormit la ea.*

'Bunica Laura invites her grandchildren over often. Daniel and Monica slept over.'

Sentence: *Una dintre cele mai arzătoare dorințe ale Monicăi e să meargă la ...*

'One of Monica's most burning wishes is to go to ...'

Context: *O parte din familie s-a dus în vacanță. Andrei și Monica erau împreună la plajă.*

'A part of the family went on vacation. Andrei and Monica were at the beach together.'

Sentence: *A fost o iarnă foarte friguroasă, dar acum lui Andrei îi este ...*

'It's been quite a cold winter, but now Andrei is ...'

Context: *Irina și Elena au ieșit în oraș. Acum, fetele discutau despre ce mai aveau de făcut.*

'Irina and Elena went out. Now, the girls were talking about what else they had to do.'

Sentence: *Una dintre cele două fete este nemulțumită de...*

'One of the two girls is quite displeased with ...'

Context: *Bunica Laura a dat o petrecere aseară. Monica a rămas peste noapte..*

'Bunica Laura had a party last night. Monica stayed overnight.'

Sentence: *După petrecerea de ieri, Monica este supărată pe...*

'After yesterday's party, Monica is mad at ...'

Experiment 3: Comprehension - Referential Subjects

The items from the first comprehension task in *Chapter 4* are listed below. The first item also includes the experimental pictures. The pictures for all conditions of the 15 critical items, fillers, sound files, instructions, PsychoPy scripts, and data analsyis can be found in the relevant folder at the following OSF Repository link `https://osf.io/e2p9w/`.

Item 1

Unambiguous Context:

Acesta este Andrei.

'This is Andrei.'

Aceasta este Irina.

'This is Irina.'

Ambiguous Context:

Acesta este Andrei.

'This is Andrei.'

Acesta este Mihai.

'This is Mihai.'

GENDER GROUP	GENDER UNAMBIGUOUS 
DISJOINT (FEM. PRONOUN)	*Acasă la Irina, **Andrei** a vorbit despre ea.* home at Irina, Andrei has talked about her 'At Irina's house, Andrei talked about her´
REFLEXIVE (MASC. PRONOUN)	*Acasă la Irina, **Andrei** a vorbit despre **el**.* home at Irina, Andrei has talked about him 'At Irina's house, Andrei talked about him.´

GENDER & FORM GROUP	AMBIGUOUS 
AMBIGUOUS (MASC. PRONOUN)	*Acasă la **Mihai, Andrei** a vorbit despre **el.*** home at Mihai, Andrei has talked about him 'At Mihai's house, Andrei talked about him.'

FORM GROUP	FORM UNAMBIGUOUS 
DISJOINT (DEMONSTRATIVE)	*Acasă la **Mihai**, **Andrei** a vorbit despre **acesta.*** home at Mihai, Andrei has talked about this one 'At Mihai's house, Andrei talked about this one´
REFLEXIVE (EMPHATIC REFL.)	*Acasă la **Mihai**, **Andrei** a vorbit despre **el însuşi*** home at Mihai, Andrei has talked about him himself 'At Mihai's house, Andrei talked about himself.'

Item 2

Context: *Acesta este Bogdan. Ace(a)sta este Elena/Daniel.*

'This is Bogdan. This is Elena/Daniel.'

GENDER GROUP	GENDER UNAMBIGUOUS
DISJOINT (FEM. PRONOUN)	*La cina Elenei,* ***Bogdan*** *a povestit despre ea.* at dinner Elena Bogdan has told-stories about her 'At Elena's dinner, Bogdan told stories about her.'
REFLEXIVE (MASC. PRONOUN)	*La cina Elenei,* ***Bogdan*** *a povestit despre* ***el****.* at dinner Elena Bogdan has told-stories about him 'At Elena's dinner, Bogdan told stories about him.´

GENDER & FORM GROUP	AMBIGUOUS
AMBIGUOUS (MASC. PRONOUN)	*La cina lui* ***Daniel, Bogdan*** *a povestit despre* ***el.*** at dinner of Daniel Bogdan has told-stories about him 'At Daniel's dinner, Bogdan told stories about him.'

FORM GROUP	FORM UNAMBIGUOUS
DISJOINT (DEMONSTRATIVE)	*La cina lui* ***Daniel, Bogdan*** *a povestit despre* ***acesta.*** at dinner of Daniel Bogdan has told-stories about this one 'At Daniel's dinner, Bogdan told stories about this one.'
REFLEXIVE (EMPHATIC REFL.)	*La cina lui* ***Daniel, Bogdan*** *a povestit despre* ***el însuşi****.* at dinner of Daniel Bogdan has told-stories about him himself 'At Daniel's dinner, Bogdan told stories about himself.'

Item 3

Context: *Ace(a)sta este Monica/Andrei. Acesta este Daniel.*

'This is Monica/Andrei. This is Daniel.'

GENDER GROUP	GENDER UNAMBIGUOUS
DISJOINT (FEM. PRONOUN)	*La recepția Monicăi*, ***Daniel*** *a trăncănit despre ea.* at reception Monica Daniel has jabbered about her 'At Monica's reception, Daniel jabbered about her.'
REFLEXIVE (MASC. PRONOUN)	*La recepția Monicăi*, ***Daniel*** *a trăncănit despre* ***el****.* at reception Monica Daniel has jabbered about him 'At Monica's reception, Daniel jabbered about him.´

GENDER & FORM GROUP	AMBIGUOUS
AMBIGUOUS (MASC. PRONOUN)	*La recepția lui* ***Andrei***, ***Daniel*** *a trăncănit despre* ***el.*** at reception Andrei Daniel has jabbered about him 'At Andrei's reception, Daniel jabbered about him.'

FORM GROUP	FORM UNAMBIGUOUS
DISJOINT (DEMONSTRATIVE)	*La recepția lui* ***Andrei***, ***Daniel*** *a trăncănit despre* ***acesta.*** at reception Andrei Daniel has jabbered about this one 'At Andrei's reception, Daniel jabbered about this one.'
REFLEXIVE (EMPHATIC REFL.)	*La recepția lui* ***Andrei***, ***Daniel*** *a trăncănit despre* ***el însuşi****.* at reception Andrei Daniel has jabbered about him himself 'At Andrei's reception, Daniel jabbered about himself.'

Item 4

Context: *Ace(a)sta este Bogdan/Anca. Acesta este Mihai.*

'This is Bogdan/Anca. This is Mihai.'

GENDER GROUP	GENDER UNAMBIGUOUS
DISJOINT (FEM. PRONOUN)	*La prânzul Ancăi, **Mihai** a mințit despre ea.* at lunch Anca Mihai has lied about her 'At Anca's lunch, Mihai lied about her.'
REFLEXIVE (MASC. PRONOUN)	*La prânzul Ancăi, **Mihai** a mințit despre **el**.* at lunch Anca Mihai has lied about him 'At Anca's lunch, Mihai lied about him.´

GENDER & FORM GROUP	AMBIGUOUS
AMBIGUOUS (MASC. PRONOUN)	*La prânzul lui **Bogdan**, **Mihai** a mințit despre **el.*** at lunch of Bogdan Mihai has lied about him 'At Bogdan's lunch, Mihai lied about him.'

FORM GROUP	FORM UNAMBIGUOUS
DISJOINT (DEMONSTRATIVE)	*La prânzul lui **Bogdan**, **Mihai** a mințit despre **acesta.*** at lunch of Bogdan Mihai has lied about this one 'At Bogdan's lunch, Mihai lied about this one.'
REFLEXIVE (EMPHATIC REFL.)	*La prânzul lui **Bogdan**, **Mihai** a mințit despre **el însuşi**.* at lunch of Bogdan Mihai has lied about him himself 'At Bogdan's lunch, Mihai lied about himself.'

Item 5

Context: *Acesta este Andrei. Ace(a)sta este Daniel/Monica.*

'This is Andrei. This is Daniel/Monica.'

GENDER GROUP	GENDER UNAMBIGUOUS
DISJOINT (FEM. PRONOUN)	*În bucătăria Monicăi,* ***Andrei*** *a gătit pentru ea.* in kitchen Monica Andrei has cooked for her 'In Monica's kitchen, Andrei cooked for her.'
REFLEXIVE (MASC. PRONOUN)	*În bucătăria Monicăi,* ***Andrei*** *a gătit pentru* ***el****.* in kitchen Monica Andrei has cooked for him 'In Monica's kitchen, Andrei cooked for him.´

GENDER & FORM GROUP	AMBIGUOUS
AMBIGUOUS (MASC. PRONOUN)	*În bucătăria lui* ***Daniel****,* ***Andrei*** *a gătit pentru* ***el.*** in kitchen of Daniel Andrei has cooked for him 'In Daniel's kitchen, Andrei cooked for him.'

FORM GROUP	FORM UNAMBIGUOUS
DISJOINT (DEMONSTRATIVE)	*În bucătăria lui* ***Daniel****,* ***Andrei*** *a gătit pentru* ***acesta.*** in kitchen of Daniel Andrei has cooked for this one 'In Daniel's kitchen, Andrei cooked for this one.'
REFLEXIVE (EMPHATIC REFL.)	*În bucătăria lui* ***Daniel****,* ***Andrei*** *a gătit pentru* ***el însuşi****.* in kitchen of Daniel Andrei has cooked for him himself 'In Daniel's kitchen, Andrei cooked for himself.'

Item 6

Context: *Acesta este Bogdan. Ace(a)sta este Mihai/Anca.*

'This is Bogdan. This is Mihai/Anca.'

GENDER GROUP	GENDER UNAMBIGUOUS
DISJOINT (FEM. PRONOUN)	*La reuniunea Ancăi,* ***Bogdan*** *a pălăvrăgit despre ea.* at reunion Anca Bogdan has jabbered about her 'At Anca's reunion, Bogdan jabbered about her.'
REFLEXIVE (MASC. PRONOUN)	*La reuniunea Ancăi,* ***Bogdan*** *a pălăvrăgit despre* ***el****.* at reunion Anca Bogdan has jabbered about him 'At Anca's reunion, Bogdan jabbered about him.´

GENDER & FORM GROUP	AMBIGUOUS
AMBIGUOUS (MASC. PRONOUN)	*La reuniunea lui* ***Mihai****,* ***Andrei*** *a pălăvrăgit despre* ***el.*** at reunion of Mihai Bogdan has jabbered about him 'At Mihai's reunion, Bogdan jabbered about him.'

FORM GROUP	FORM UNAMBIGUOUS
DISJOINT (DEMONSTRATIVE)	*La reuniunea lui* ***Mihai****,* ***Andrei*** *a pălăvrăgit despre* ***acesta.*** at reunion of Mihai Bogdan has jabbered about this one 'At Mihai's reunion, Bogdan jabbered about this one.'
REFLEXIVE (EMPHATIC REFL.)	*La reuniunea lui* ***Mihai****,* ***Andrei*** *a pălăvrăgit despre* ***el însuşi****.* at reunion of Mihai Bogdan has jabbered about him himself 'At Mihai's reunion, Bogdan jabbered about himself.'

Item 7

Context: *Ace(a)sta este Andrei/Elena.Acesta este Mihai.*

'This is Andrei/Elena. This is Mihai.'

GENDER GROUP	GENDER UNAMBIGUOUS
DISJOINT (FEM. PRONOUN)	*La picnicul Elenei, **Mihai** a glumit despre ea.* at picnic Elena Mihai has joked about her 'At Elena's picnic, Mihai joked about her.'
REFLEXIVE (MASC. PRONOUN)	*La picnicul Elenei, **Mihai** a glumit despre **el**.* at picnic Elena Mihai has joked about him 'At Elena's picnic, Mihai joked about him.'

GENDER & FORM GROUP	AMBIGUOUS
AMBIGUOUS (MASC. PRONOUN)	*La picnicul lui **Andrei**, **Mihai** a glumit despre **el.*** at picnic of Andrei Mihai has joked about him 'At Andrei's picnic, Mihai joked about him.'

FORM GROUP	FORM UNAMBIGUOUS
DISJOINT (DEMONSTRATIVE)	*La picnicul lui **Andrei**, **Mihai** a glumit despre **acesta.*** at picnic of Andrei Mihai has joked about this one 'At Andrei's picnic, Mihai joked about this one.'
REFLEXIVE (EMPHATIC REFL.)	*La picnicul lui **Andrei**, **Mihai** a glumit despre **el însuşi**.* at picnic of Andrei Mihai has joked about him himself 'At Andrei's picnic, Mihai joked about himself.'

Item 8

Context: *Ace(a)sta este Irina/Andrei. Aceasta este Anca.*

'This is Irina/Andrei. This is Anca.'

GENDER GROUP	GENDER UNAMBIGUOUS
DISJOINT (MASC. PRONOUN)	*La aniversarea lui Andrei,* ***Anca*** *a hodorogit despre el.* at anniversary of Andrei Anca has yapped about him 'At Andrei's anniversary, Anca yapped about him.'
REFLEXIVE (FEM. PRONOUN)	*La aniversarea lui Andrei,* ***Anca*** *a hodorogit despre* ***ea****.* at anniversary of Andrei Anca has yapped about her 'At Andrei's anniversary, Anca yapped about her.'

GENDER & FORM GROUP	AMBIGUOUS
AMBIGUOUS (FEM. PRONOUN)	*La aniversarea* ***Irinei****,* ***Anca*** *a hodorogit despre* ***ea.*** at anniversary Irina Anca has yapped about her 'At Irina's anniversary, Anca yapped about her.'

FORM GROUP	FORM UNAMBIGUOUS
DISJOINT (DEMONSTRATIVE)	*La aniversarea* ***Irinei****,* ***Anca*** *a hodorogit despre* ***aceasta.*** at anniversary Irina Anca has yapped about this one 'At Irina's anniversary, Anca yapped about this one.'
REFLEXIVE (EMPHATIC REFL.)	*La aniversarea* ***Irinei****,* ***Anca*** *a hodorogit despre* ***ea însăşi****.* at anniversary Irina Anca has yapped about her herself 'At Irina's anniversary, Anca yapped about herself.'

Item 9

Context: *Aceasta este Elena. Ace(a)sta este Monica/Daniel.*

'This is Elena. This is Monica/Daniel. '

Gender Group	Gender Unambiguous
Disjoint (Masc. Pronoun)	*În sufrageria lui Daniel, **Elena** a îndrugat despre el.* in living-room of Daniel Elena has gone-on-and-on about him 'In Daniel's living room, Elena went on and on about him.'
Reflexive (Fem. Pronoun)	*În sufrageria lui Daniel, **Elena** a îndrugat despre **ea**.* in living-room of Daniel Elena has gone-on-and-on about her 'In Daniel's living room, Elena went on and on about her.'

Gender & Form Group	Ambiguous
Ambiguous (Fem. Pronoun)	*În sufrageria **Monicăi**, **Elena** a îndrugat despre **ea.*** in living-room Monica Elena has gone-on-and-on about her 'In Monica's living room, Elena went on and on about her.'

Form Group	Form Unambiguous
Disjoint (Demonstrative)	*În sufrageria **Monicăi**, **Elena** a îndrugat despre **aceasta.*** in living-room Monica Elena has gone-on-and-on about this one 'In Monica's living room, Elena went on and on about this one.'
Reflexive (Emphatic Refl.)	*În sufrageria **Monicăi**, **Elena** a îndrugat despre **ea însăşi**.* in living-room Monica Elena has gone-on-and-on about her herself 'In Monica's living room, Elena went on and on about herself.'

Item 10

Context: *Ace(a)sta este Anca/Bogdan. Aceasta este Irina.*

'This is Anca/Bogdan. This is Irina. '

GENDER GROUP	GENDER UNAMBIGUOUS
DISJOINT (MASC. PRONOUN)	*La şcoala lui Bogdan, **Irina** a troncănit despre el.* at school of Bogdan Irina has chattered about him 'At Bogdan's school, Irina chattered about him.'
REFLEXIVE (FEM. PRONOUN)	*La şcoala lui Bogdan, **Irina** a troncănit despre **ea**.* at school of Bogdan Irina has chattered about her 'At Bogdan's school, Irina chattered about her.'

GENDER & FORM GROUP	AMBIGUOUS
AMBIGUOUS (FEM. PRONOUN)	*La şcoala **Ancăi**, **Irina** a troncănit despre **ea.*** at school Anca Irina has chattered about her 'At Anca's school, Irina chattered about her.'

FORM GROUP	FORM UNAMBIGUOUS
DISJOINT (DEMONSTRATIVE)	*La şcoala **Ancăi**, **Irina** a troncănit despre **aceasta.*** at school Anca Irina has chattered about this one 'At Anca's school, Irina chattered about this one.'
REFLEXIVE (EMPHATIC REFL.)	*La şcoala **Ancăi**, **Irina** a troncănit despre **ea însăşi**.* at school Anca Irina has chattered about her herself 'At Anca's school, Irina chattered about herself.'

Item 11

Context: *Aceasta este Monica. Ace(a)sta este Elena/Mihai.*

'This is Monica. This is Elena/Mihai. '

GENDER GROUP	GENDER UNAMBIGUOUS
DISJOINT (MASC. PRONOUN)	*La majoratul lui Mihai,* ***Monica*** *a debitat despre el.* at 18th-birthday of Mihai Monica has jabbered about him 'At Mihai's 18th birthday, Monica jabbered about him.'
REFLEXIVE (FEM. PRONOUN)	*La majoratul lui Mihai,* ***Monica*** *a debitat despre* ***ea****.* at 18th-birthday of Mihai Monica has jabbered about her 'At Mihai's 18th birthday, Monica jabbered about her.'

GENDER & FORM GROUP	AMBIGUOUS
AMBIGUOUS (FEM. PRONOUN)	*La majoratul* ***Elenei***, ***Irina*** *a debitat despre* ***ea.*** at 18th-birthday Elena Irina has jabbered about her 'At Elena's 18th birthday, Monica jabbered about her.'

FORM GROUP	FORM UNAMBIGUOUS
DISJOINT (DEMONSTRATIVE)	*La majoratul* ***Elenei***, ***Irina*** *a debitat despre* ***aceasta.*** at 18th-birthday Elena Irina has jabbered about this one 'At Elena's 18th birthday, Monica jabbered about this one.'
REFLEXIVE (EMPHATIC REFL.)	*La majoratul* ***Elenei***, ***Irina*** *a debitat despre* ***ea însăşi****.* at 18th-birthday Elena Irina has jabbered about her herself 'At Elena's 18th birthday, Monica jabbered about herself.'

Item 12

Context: *Ace(a)sta este Monica/Daniel. Aceasta este Anca.*

'This is Monica/Daniel. This is Anca. '

GENDER GROUP	GENDER UNAMBIGUOUS
DISJOINT (MASC. PRONOUN)	*După serata lui Daniel, **Anca** a visat despre el.* after soirée of Daniel Anca dreamed about him 'After Daniel's soirée , Anca dreamed about him.'
REFLEXIVE (FEM. PRONOUN)	*După serata lui Daniel, **Anca** a visat despre **ea**.* after soirée of Daniel Anca dreamed about her 'After Daniel's soirée , Anca dreamed about her.'

GENDER & FORM GROUP	AMBIGUOUS
AMBIGUOUS (FEM. PRONOUN)	*După serata **Monicăi**, **Anca** a visat despre **ea**.* after soirée Monica Anca dreamed about her 'After Monica's soirée, Anca dreamed about her.'

FORM GROUP	FORM UNAMBIGUOUS
DISJOINT (DEMONSTRATIVE)	*După serata **Monicăi**, **Anca** a visat despre **aceasta**.* after soirée Monica Anca dreamed about this one 'After Monica's soirée, Anca dreamed about this one.'
REFLEXIVE (EMPHATIC REFL.)	*După serata **Monicăi**, **Anca** a visat despre **ea însăşi**.* after soirée Monica Anca dreamed about her herself 'After Monica's soirée, Anca dreamed about herself.'

Item 13

Context: *Aceasta este Elena. Ace(a)sta este Anca/Andrei.*

'This is Elena. This is Anca/Andrei. '

GENDER GROUP	GENDER UNAMBIGUOUS
DISJOINT (MASC. PRONOUN)	*La petrecerea lui Andrei,* ***Elena*** *s-a gândit la el.* at party of Andrei Elena has thought about him 'At Andrei's party, Elena thought about him.'
REFLEXIVE (FEM. PRONOUN)	*La petrecerea lui Andrei,* ***Elena*** *s-a gândit la* ***ea****.* at party of Andrei Elena has thought about her 'At Andrei's party, Elena thought about her.'

GENDER & FORM GROUP	AMBIGUOUS
AMBIGUOUS (FEM. PRONOUN)	*La petrecerea* ***Ancăi****,* ***Elena*** *s-a gândit la* ***ea.*** at party Anca Elena has thought about her 'At Anca's party, Elena thought about her.'

FORM GROUP	FORM UNAMBIGUOUS
DISJOINT (DEMONSTRATIVE)	*La petrecerea* ***Ancăi****,* ***Elena*** *s-a gândit la* ***aceasta.*** at party Anca Elena has thought about this one 'At Anca's party, Elena thought about this one.'
REFLEXIVE (EMPHATIC REFL.)	*La petrecerea* ***Ancăi****,* ***Elena*** *s-a gândit la* ***ea însăşi****.* at party Anca Elena has thought about her herself 'At Anca's party, Elena thought about herself.'

Item 14

Context: *Ace(a)sta este Elena/Mihai.Aceasta este Irina.*

'This is Elena/Mihai. This is Irina. '

GENDER GROUP	GENDER UNAMBIGUOUS
DISJOINT (MASC. PRONOUN)	*În jurnalul lui Mihai, **Irina** a citit despre el.* in diary of Mihai Irina has read about him 'In Mihai's diary, Irina read about him.'
REFLEXIVE (FEM. PRONOUN)	*În jurnalul lui Mihai, **Irina** a citit despre **ea**.* in diary of Mihai Irina has read about her 'In Mihai's diary, Irina read about her.'

GENDER & FORM GROUP	AMBIGUOUS
AMBIGUOUS (FEM. PRONOUN)	*În jurnalul **Elenei**, **Irina** a citit despre **ea.*** in diary Elena Irina has read about her 'In Elena's diary, Irina read about her.'

FORM GROUP	FORM UNAMBIGUOUS
DISJOINT (DEMONSTRATIVE)	*În jurnalul **Elenei**, **Irina** a citit despre **aceasta.*** in diary Elena Irina has read about this one 'In Elena's diary, Irina read about this one.'
REFLEXIVE (EMPHATIC REFL.)	*În jurnalul **Elenei**, **Irina** a citit despre **ea însăşi**.* in diary Elena Irina has read about her herself 'In Elena's diary, Irina read about herself.'

Item 15

Context: *Ace(a)sta este Irina/Bogdan. Aceasta este Monica.*

'This is Irina/Bogdan. This is Monica. '

GENDER GROUP	GENDER UNAMBIGUOUS
DISJOINT (MASC. PRONOUN)	*La ziua lui Bogdan, **Monica** a râs de el.* at birthday of Bogdan Monica has laughed at him 'At Bogdan's birthday, Monica laughed at him.'
REFLEXIVE (FEM. PRONOUN)	*La ziua lui Bogdan, **Monica** a râs de **ea**.* at birthday of Bogdan Monica has laughed at her 'At Bogdan's birthday, Monica laughed at her.'

GENDER & FORM GROUP	AMBIGUOUS
AMBIGUOUS (FEM. PRONOUN)	*La ziua **Irinei**, **Monica** a râs de **ea.*** at birthday Irina Monica has laughed at her 'At Irina's birthday, Monica laughed at her.'

FORM GROUP	FORM UNAMBIGUOUS
DISJOINT (DEMONSTRATIVE)	*La ziua **Irinei**, **Monica** a râs de **aceasta.*** at birthday Irina Monica has laughed at this one 'At Irina's birthday, Monica laughed at this one.'
REFLEXIVE (EMPHATIC REFL.)	*La ziua **Irinei**, **Monica** a râs de **ea însăşi**.* at birthday Irina Monica has laughed at her herself 'At Irina's birthday, Monica laughed at herself.'

Filler Items

Context: *Acesta este Mihai. Este un tip destul de vesel.*'This is Mihai. He's a pretty cheerful guy.'
Sentence: *Mihai și-a imaginat ceva ce îl face fericit.* 'Mihai imagined something that makes him happy.'

Context: *Aceasta este Elena. Se mai întristează uneori.*'This is Elena. She gets sad from time to time.'
Sentence: *Aceasta este una din cele mai mari temeri ale Elenei.* 'This is one of Elena's greatest fears.'

Context: *Acesta este Daniel. Este mai degrabă introvertit.* 'This is Daniel. He is rather introverted.'
Sentence: *Acum, Daniel e în locul lui preferat.* 'Now, Daniel is in his favorite place.'

Context: *Acesta este Andrei. Acesta este Daniel.* 'This is Andrei. This is Daniel.'
Sentence: *Acest băiat a verificat vremea înainte să plece de acasă.* 'This boy checked the weather report before leaving home.'

Context: *Aceasta este Irina. Aceasta este Monica.* 'This is Irina. This is Monica'
Sentence: *Această fată le-a scris prietenilor ei despre hobbyul ei preferat.* 'This girl wrote her friends about her favorite hobby.'

Context: *Aceasta este Irina. Aceasta este Elena.* 'This is Irina. This is Elena.'
Sentence: *Ieri, fata aceasta a verificat dacă mai are ceva urgent de făcut.* 'Yesterday, this girl checked if she had anything urgent to do.'

Context: *Acesta este Bogdan. Aceasta este Irina.* 'This is Bogdan. This is Irina.'
Sentence: *Aseară, băiatul acesta a vorbit la telefon despre actualități.* 'Last evening, this boy talked on the phone about the latest news.'

Context: *Acesta este Mihai. Aceasta este Anca.* 'This is Mihai. This is Anca.'
Sentence: *Persoana aceasta s-a gândit la lucruri cât mai relaxante.* 'This person thought about things that were as relaxing as possible.'

Context: *Acesta este Mihai. Aceasta este Monica.* 'This is Mihai. This is Monica.'
Sentence: *În ciuda faptului că nu era un examen ușor, persoana aceasta s-a descurcat mai bine decât a anticipat.* 'Despite it not having been an easy exam, this person did better than they anticipated.'

Context: *Aceasta este Anca. Are speranțe mari pentru viitor.* 'This is Anca. She has high hopes for the future.'
Sentence: *Deși se consideră o învingătoare, Anca nu a primit locul de muncă dorit.* 'Although she considers herself a winner, Anca did not get the job offer she wanted.'

Context: *Acesta este Bogdan. Aceasta este Monica.* 'This is Bogdan. This is Monica.'
Sentence: *Deși amândoi au mers la o petrecere aseara, doar unul dintre ei este nemulțumit de cum s-a desfășurat seara.* 'Although both of them went to a party last night, only one of them is unhappy about how the evening went.'

Context: *Acesta este Andrei.El are câteva mari pasiuni.* 'This is Andrei. He has a couple of big hobbies.'
Sentence: *Acest gând îl bucură mult pe Andrei.* 'This thought makes Andrei very happy.'

Context: *Aceasta este Irina. Este în mod clar perfecționistă.* 'This is Irina. She is obviously a perfectionist.'
Sentence: *Irina contemplează toate lucrurile pe care le-a rezolvat.* 'Irina is contemplating all of the things she had checked off her list.'

Context: *Acesta este Bogdan. Îi place să comunice.* 'This is Bogdan. Bogdan enjoys communicating. '
Sentence: *Pentru Bogdan, acesta este subiectul preferat de conversație.* 'For Bogdan, this is his favorite topic of conversation.'

Context: *Aceasta este Monica. Reflectează la un eveniment de ieri.* 'This is Monica. She's thinking about an event from yesterday. '
Sentence: *Monica este extrem de supărată pe situație.* 'Monica is extremely mad at the situation.'

Experiment 4: Comprehension - Quantified Subjects

The items from the second comprehension task in *Chapter 4* are listed below. The first item also includes the experimental pictures. The pictures for all conditions of the 15 critical items, fillers, sound files, instructions, PsychoPy scripts, and data analsyis can be found in the relevant folder at the following OSF Repository link `https://osf.io/e2p9w/`.

Item 1

Unambiguous Context:

Bunica Maria a fost vizitată recent de către familie. Andrei, Daniel și Mihai au fost și ei prezenți.

'Grandma Maria was recently visited by her family. Andrei, Daniel and Mihai were there too.'

Ambiguous Context:

Bunicul Paul a fost vizitat recent de către familie. Andrei, Daniel și Mihai au fost și ei prezenți.

'Grandpa Paul was recently visited by his family. Andrei, Daniel and Mihai were there too.'

Gender Group	Gender Unambiguous
	
Disjoint (Fem. Pronoun)	*Acasă la <u>bunica Maria</u>, **fiecare băiat** a vorbit despre <u>ea.</u>* home at grandma Maria, every boy has talked about her 'At grandma Maria's house, every boy talked about her.'
Reflexive (Masc. Pronoun)	*Acasă la <u>bunica Maria</u>, **fiecare băiat** a vorbit despre **el**.* home at grandma Maria, every boy has talked about him 'At grandma Maria's house, every boy talked about him.'

Gender & Form Group	Ambiguous
	
Ambiguous (Masc. Pronoun)	*Acasă la **bunicul Paul, fiecare băiat** a vorbit despre **el.*** home at grandpa Paul, every boy has talked about him 'At grandpa Paul's house, every boy talked about him.'

Form Group	Form Unambiguous
	
Disjoint (Demonstrative)	*Acasă la **bunicul Paul, fiecare băiat** a vorbit despre **acesta.*** home at grandpa Paul, every boy has talked about this one 'At grandpa Paul's house, every boy talked about this one´
Reflexive (Emphatic Refl.)	*Acasă la **bunicul Paul, fiecare băiat** a vorbit despre **el însuşi*** home at grandpa Paul, every boy has talked about him himself 'At grandpa Paul's house, every boy talked about himself.'

Item 2

Unambiguous Context:

Bunica Laura a gătit aseară. Dintre meseni fac parte și nepoții Mihai, Daniel și Andrei.

'Grandma Laura cooked last night. Her grandsons Mihai, Daniel and Andrei were also at the dinner.'

Ambiguous Context:

Bunicul Radu a gătit aseară. Dintre meseni fac parte și nepoții Mihai, Daniel și Andrei.

'Grandpa Radu cooked last night. His grandsons Mihai, Daniel and Andrei were also at the dinner.'

GENDER GROUP	GENDER UNAMBIGUOUS
DISJ. (FEM. PRON.)	*La cina bunicii Laura,* ***fiecare nepot*** *a povestit despre ea.* at dinner grandma Laura every grandson has told-stories about her 'At grandma Laura's dinner, every grandson told stories about her.'
REFL. (MASC. PRON.)	*La cina bunicii Laura,* ***fiecare nepot*** *a povestit despre* ***el****.* at dinner grandma Laura every grandson has told-stories about him 'At grandma Laura's dinner, every grandson told stories about him.'

GENDER & FORM GROUP	AMBIGUOUS
AMBIG. (MASC. PRON.)	*La cina* ***bunicului Radu, fiecare nepot*** *a povestit despre* ***el.*** at dinner grandpa Radu every grandson has told-stories about him 'At grandpa Radu's dinner, every grandson told stories about him.'

FORM GROUP	FORM UNAMBIGUOUS
DISJ. (DEM.)	*La cina* ***bunicului Radu, fiecare nepot*** *a povestit despre* ***acesta.*** at dinner grandpa Radu every grandson has told-stories about this one 'At grandpa Radu's dinner, every grandson told stories about this one´
REFL. (EMPH. REFL.)	*La cina* ***bunicului Radu, fiecare nepot*** *a povestit despre* ***el însuşi*** at dinner grandpa Radu every grandson has told-stories about him himself 'At grandpa Radu's dinner, every grandson told stories about himself.'

Item 3

Unambiguous Context:

Mătuşa Diana a avut o recepție aseară. Andrei, Mihai și Daniel au mers și ei

'Aunt Diana had a reception last night. Andrei, Mihai and Daniel went as well.'

Ambiguous Context:

Unchiul Vlad a avut o recepție aseară. Andrei, Mihai și Daniel au mers și ei.

'Uncle Vlad had a reception last night. Andrei, Mihai and Daniel went as well.'

GENDER GROUP	GENDER UNAMBIGUOUS
DISJ. (FEM. PRON.)	*La recepţia mătuşii Diana, **fiecare băiat** a trăncănit despre ea.* at reception aunt Diana every boy has jabbered about her 'At aunt Diana's dinner, every boy jabbered about her.'
REFL. (MASC. PRON.)	*La recepţia mătuşii Diana, **fiecare băiat** a trăncănit despre **el**.* at reception aunt Diana every boy has jabbered about him 'At aunt Diana's dinner, every boy jabbered about him.'

GENDER & FORM GROUP	AMBIGUOUS
AMBIG. (MASC. PRON.)	*La recepţia **unchiului Vlad, fiecare băiat** a trăncănit despre **el.*** at reception uncle Vlad every boy has jabbered about him 'At uncle Vlad's dinner, every boy jabbered about him.'

FORM GROUP	FORM UNAMBIGUOUS
DISJ. (DEM.)	*La recepţia **unchiului Vlad, fiecare băiat** a trăncănit despre **acesta.*** at reception uncle Vlad every boy has jabbered about this one 'At uncle Vlad's dinner, every boy jabbered about this one´
REFL. (EMPH. REFL.)	*La recepţia **unchiului Vlad, fiecare băiat** a trăncănit despre **el însuşi**.* at reception uncle Vlad every boy has jabbered about him himself 'At uncle Vlad's dinner, every boy jabbered about himself.'

Item 4

Unambiguous Context:

Bunica Laura își cheamă des nepoții acasă. Andrei, Daniel și Mihai s-au dus chiar astăzi.

'Grandma Laura invites her grandchildren over often. Andrei, Daniel and Mihai went over today.'

Ambiguous Context:

Unchiul George își cheamă des nepoții acasă. Andrei, Daniel și Mihai s-au dus chiar astăzi.

'Uncle George invites his nephews over often. Andrei, Daniel and Mihai went over today.'

GENDER GROUP	GENDER UNAMBIGUOUS
DISJ. (FEM. PRON.)	*În vizită la bunica Laura, **fiecare băiat** a balivernat despre ea.* in visit at grandma Laura every boy has rambled about her 'Visiting grandma Laura, every boy rambled about her.'
REFL. (MASC. PRON.)	*În vizită la bunica Laura, **fiecare băiat** a balivernat despre **el**.* in visit at grandma Laura every boy has rambled about him 'Visiting grandma Laura, every boy rambled about him.'

GENDER & FORM GROUP	AMBIGUOUS
AMBIG. (MASC. PRON.)	*În vizită la **unchiul George, fiecare băiat** a balivernat despre **el.*** in visit at uncle George every boy has rambled about him 'Visiting uncle George, every boy rambled about him.'

FORM GROUP	FORM UNAMBIGUOUS
DISJ. (DEM.)	*În vizită la **unchiul George, fiecare băiat** a balivernat despre **acesta.*** in visit at uncle George every boy has rambled about this one 'Visiting uncle George, every boy rambled about this one´
REFL. (EMPH. REFL.)	*În vizită la **unchiul George, fiecare băiat** a balivernat despre **el însuşi**.* in visit at uncle George every boy has rambled about him himself 'Visiting uncle George, every boy rambled about himself.'

Item 5

Unambiguous Context:

Mătuşa Raluca și-a primit nepoții la ea ziua trecută. Mihai, Andrei și Daniel s-au dus împreună.

'Aunt Raluca was paid a visit by her nephews the other day. Mihai, Andrei and Daniel went together.'

Ambiguous Context:

Bunicul Radu și-a primit nepoții la el ziua trecută. Mihai, Andrei și Daniel s-au dus împreună.

'Grandpa Radu was paid a visit by his grandsons the other day. Mihai, Andrei and Daniel went together.'

GENDER GROUP	GENDER UNAMBIGUOUS
DISJ. (FEM. PRON.)	*În bucătăria mătuşii Raluca,* ***fiecare băiat*** *a gătit pentru ea.* in kitchen aunt Raluca every boy has cooked for her 'In Aunt Raluca's kitchen, every boy cooked for her.'
REFL. (MASC. PRON.)	*În bucătăria mătuşii Raluca,* ***fiecare băiat*** *a gătit pentru* ***el****.* in kitchen aunt Raluca every boy has cooked for him 'In Aunt Raluca's kitchen, every boy cooked for him.'
GENDER & FORM GROUP	**AMBIGUOUS**
AMBIG. (MASC. PRON.)	*În bucătăria* ***bunicului Radu, fiecare băiat*** *a gătit pentru* ***el.*** in kitchen grandpa Radu every boy has cooked for him 'In Grandpa Radu's kitchen, every boy cooked for him.'
FORM GROUP	**FORM UNAMBIGUOUS**
DISJ. (DEM.)	*În bucătăria* ***bunicului Radu, fiecare băiat*** *a gătit pentru* ***acesta.*** in kitchen grandpa Radu every boy has cooked for this one 'In Grandpa Radu's kitchen, every boy cooked for this one´
REFL. (EMPH. REFL.)	*În bucătăria* ***bunicului Radu, fiecare băiat*** *a gătit pentru* ***el însuşi****.* in kitchen grandpa Radu every boy has cooked for him himself 'In Grandpa Radu's kitchen, every boy cooked for himself.'

Item 6

Unambiguous Context:

Bunica Maria a organizat o reuniune de familie. Au fost prezenți și Daniel, Mihai și Andrei.

'Grandma Maria organized a family reunion. Daniel, Mihai and Andrei were also present.'

Ambiguous Context:

Unchiul Vlad a organizat o reuniune de familie. Au fost prezenți și Daniel, Mihai și Andrei.

'Uncle Vlad organized a family reunion. Daniel, Mihai and Andrei were also present.'

GENDER GROUP	GENDER UNAMBIGUOUS
DISJ. (FEM. PRON.)	*La reuniunea bunicii Maria, **fiecare nepot** a sporovăit despre ea.* at reunion gradma Maria every grandson has yapped about her 'At Grandma Maria's reunion, every grandson yapped about her.'
REFL. (MASC. PRON.)	*La reuniunea bunicii Maria, **fiecare nepot** a sporovăit despre **el**.* at reunion gradma Maria every grandson has yapped about him 'At Grandma Maria's reunion, every grandson yapped about him.'
GENDER & FORM GROUP	**AMBIGUOUS**
AMBIG. (MASC. PRON.)	*La reuniunea **unchiului Vlad, fiecare nepot** a sporovăit despre **el.*** at reunion uncle Vlad every nephew has yapped about him 'At uncle Vlad's reunion, every nephew yapped about him.'
FORM GROUP	FORM UNAMBIGUOUS
DISJ. (DEM.)	*La reuniunea **unchiului Vlad, fiecare nepot** a sporovăit despre **acesta.*** at reunion uncle Vlad every nephew has yapped about this one 'At uncle Vlad's reunion, every nephew yapped about this one.'
REFL. (EMPH. REFL.)	*La reuniunea **unchiului Vlad, fiecare nepot** a sporovăit despre **el însuşi**.* at reunion uncle Vlad every nephew has yapped about him himself 'At uncle Vlad's reunion, every nephew yapped about himself.'

Item 7

Unambiguous Context:

Mătuşa Diana a organizat un picnic weekendul trecut. Daniel, Andrei și Mihai au mers cu drag.

'Aunt Diana organized a picnic last weekend. Daniel, Andrei and Mihai happily went.'

Ambiguous Context:

Bunicul Paul a organizat un picnic weekendul trecut. Daniel, Andrei și Mihai au mers cu drag.

'Grandpa Paul organized a picnic last weekend. Daniel, Andrei and Mihai happily went.'

GENDER GROUP	GENDER UNAMBIGUOUS
DISJ. (FEM. PRON.)	*La picnicul mătuşii Diana, **fiecare nepot** a glumit despre ea.* at picnic aunt Diana every nephew has joked about her 'At Aunt Diana's picnic, every nephew joked about her.'
REFL. (MASC. PRON.)	*La picnicul mătuşii Diana, **fiecare nepot** a glumit despre **el**.* at picnic aunt Diana every nephew has joked about him 'At Aunt Diana's picnic, every nephew joked about him.'

GENDER & FORM GROUP	AMBIGUOUS
AMBIG. (MASC. PRON.)	*La picnicul **bunicului Paul, fiecare nepot** a glumit despre **el.*** at picnic grandpa Paul every grandson has joked about him 'At Grandpa Paul's picnic, every grandson joked about him.'

FORM GROUP	FORM UNAMBIGUOUS
DISJ. (DEM.)	*La picnicul **bunicului Paul, fiecare nepot** a glumit despre **acesta.*** at picnic grandpa Paul every grandson has joked about this one 'At Grandpa Paul's picnic, every grandson joked about this one.'
REFL. (EMPH. REFL.)	*La picnicul **bunicului Paul, fiecare nepot** a glumit despre **el însuşi**.* at picnic grandpa Paul every grandson has joked about him himself 'At Grandpa Paul's picnic, every grandson joked about himself.'

Item 8

Unambiguous Context:

Bunicul Paul doar ce a împlinit 75 de ani. Monica, Elena și Irina s-au dus și ele să îl vadă.

'Grandpa Paul just turned 75. Monica, Elena and Irina also went to see him.'

Ambiguous Context:

Bunica Laura doar ce a împlinit 70 de ani. Monica, Elena și Irina s-au dus și ele să o vadă.

'Grandma Laura just turned 70. Monica, Elena and Irina also went to see her.'

GENDER GROUP	GENDER UNAMBIGUOUS
DISJ. (MASC. PRON.)	*La aniversarea bunicului Paul,* ***fiecare fată*** *a hodorogit despre el.* at anniversary grandpa Paul every girl has yapped about him 'At Grandpa Paul's anniversary, every girl yapped about him.'
REFL. (FEM. PRON.)	*La aniversarea bunicului Paul,* ***fiecare fată*** *a hodorogit despre* ***ea****.* at anniversary grandpa Paul every girl has yapped about her 'At Grandpa Paul's anniversary, every girl yapped about her.'

GENDER & FORM GROUP	AMBIGUOUS
AMBIG. (FEM. PRON.)	*La aniversarea* ***bunicii Laura, fiecare fată*** *a hodorogit despre* ***ea****.* at anniversary grandma Laura every girl has yapped about her 'At Grandma Laura's anniversary, every girl yapped about her.'

FORM GROUP	FORM UNAMBIGUOUS
DISJ. (DEM.)	*La aniversarea* ***bunicii Laura, fiecare fată*** *a hodorogit despre* ***aceasta.*** at anniversary grandma Laura every girl has yapped about this one 'At Grandma Laura's anniversary, every girl yapped about this one.'
REFL. (EMPH. REFL.)	*La aniversarea* ***bunicii Laura, fiecare fată*** *a hodorogit despre* ***ea însăşi****.* at anniversary grandma Laura every girl has yapped about her herself 'At Grandma Laura's anniversary, every girl yapped about herself.'

Item 9

Unambiguous Context:

Bunicul Radu a fost vizitat recent de familie. Elena, Irina și Monica au mers la el ieri.

'Grandpa Radu was recently visited by family. Elena, Irina and Monica went to see him yesterday.'

Ambiguous Context:

Bunica Maria a fost vizitată recent de familie. Elena, Irina și Monica au mers la ea ieri.

'Grandma Maria was recently visited by family. Elena, Irina and Monica went to see her yesterday'.

GENDER GROUP	GENDER UNAMBIGUOUS
DISJ. (MASC. PRON.)	*În sufrageria bunicului Radu, **fiecare nepoată** a debitat despre el.* in living-room g-pa Radu every g-daughter has rambled about him 'In G-pa Radu's living room, every g-daughter rambled about him.'
REFL. (FEM. PRON.)	*În sufrageria bunicului Radu, **fiecare nepoată** a debitat despre **ea**.* in living-room g-pa Radu every g-daughter has rambled about her 'In G-pa Radu's living room, every g-daughter rambled about her.'

GENDER & FORM GROUP	AMBIGUOUS
AMBIG. (FEM. PRON.)	*În sufrageria **bunicii Maria, fiecare nepoată** a debitat despre **ea**.* in living-room g-ma Maria every g-daughter has rambled about her 'In G-ma Maria"s living room, every g-daughter rambled about her.'

FORM GROUP	FORM UNAMBIGUOUS
DISJ. (DEM.)	*În sufrageria **bunicii Maria, fiecare nepoată** a debitat despre **aceasta.*** in living-room g-ma Maria every g-daughter has rambled about this one 'In G-ma Maria's living room, every g-daughter rambled about this one.'
REFL. (EMPH. REFL.)	*În sufrageria **bunicii Maria, fiecare nepoată** a debitat despre **ea însăşi**.* in living-room g-ma Maria every g-daughter has rambled about her herself 'In G-ma Maria's living room, every g-daughter rambled about herself.'

Item 10

Unambiguous Context:

Unchiul George își sărbătorește onomastica în iunie. Anul trecut, Irina, Monica și Elena se duseseră să îl felicite.

'Uncle George celebrates his name day in June. Last year, Irina, Monica and Elena stopped by to congratulate him.'

Ambiguous Context:

Mătușa Diana își sărbătorește onomastica în iunie. Anul trecut, Irina, Monica și Elena se duseseră să o felicite.

'Aunt Diana celebrates his name day in June. Last year, Irina, Monica and Elena stopped by to congratulate her.'

GENDER GROUP	GENDER UNAMBIGUOUS
DISJ. (MASC. PRON.)	*De onomastica unchiului George,* ***fiecare fată*** *a troncănit despre el.* of name-day uncle George every girl has chattered about him 'At Uncle George's nameday, every girl chattered about him.'
REFL. (FEM. PRON.)	*De onomastica unchiului George,* ***fiecare fată*** *a troncănit despre* ***ea****.* of name-day uncle George every girl has chattered about her 'At Uncle George's nameday, every girl chattered about her.'

GENDER & FORM GROUP	AMBIGUOUS
AMBIG. (FEM. PRON.)	*De onomastica* ***mătuşii Diana, fiecare fată*** *a troncănit despre* ***ea****.* of name-day aunt Diana every girl has chattered about her 'At Aunt Diana's nameday, every girl chattered about her.'

FORM GROUP	FORM UNAMBIGUOUS
DISJ. (DEM.)	*De onomastica* ***mătuşii Diana, fiecare fată*** *a troncănit despre despre* ***aceasta.*** of name-day aunt Diana every girl has chattered about this one 'At Aunt Diana's nameday, every girl chattered about this one.'
REFL. (EMPH. REFL.)	*De onomastica* ***mătuşii Diana, fiecare fată*** *a troncănit despre* ***ea însăşi****.* of name-day aunt Diana every girl has chattered about her herself 'At Aunt Diana's nameday, every girl chattered about herself.'

Item 11

Unambiguous Context:

Unchiul Vlad a dat o petrecere săptămâna trecută. Irina, Elena și Monica au fost și ele invitate.

'Uncle Vlad threw a party last week. Irina, Elena and Monica were also invited.'

Ambiguous Context:

Mătușa Raluca a dat o petrecere săptămâna trecută. Irina, Elena și Monica au fost și ele invitate.

'Aunt Raluca threw a party last week. Irina, Elena and Monica were also invited.'

GENDER GROUP	GENDER UNAMBIGUOUS
DISJ. (MASC. PRON.)	*La petrecerea unchiului Vlad,* ***fiecare nepoată*** *a îndrugat despre el.* at party Uncle Vlad every niece has rambled about him 'At Uncle Vlad's party, every niece rambled about him.'
REFL. (FEM. PRON.)	*La petrecerea unchiului Vlad,* ***fiecare nepoată*** *a îndrugat despre* ***ea****.* at party Uncle Vlad every niece has rambled about her 'At Uncle Vlad's party, every niece rambled about her.'

GENDER & FORM GROUP	AMBIGUOUS
AMBIG. (FEM. PRON.)	*La petrecerea* ***mătuşii Raluca, fiecare nepoată*** *a îndrugat despre* ***ea****.* at party Aunt Raluca every niece has rambled about her 'At Aunt Raluca's party, every niece rambled about her.'

FORM GROUP	FORM UNAMBIGUOUS
DISJ. (DEM.)	*La petrecerea* ***mătuşii Raluca, fiecare nepoată*** *a îndrugat despre* ***aceasta.*** at party Aunt Raluca every niece has rambled about this one 'At Aunt Raluca's party, every niece rambled about this one.'
REFL. (EMPH. REFL.)	*La petrecerea* ***mătuşii Raluca, fiecare nepoată*** *a îndrugat despre* ***ea însăşi****.* at party Aunt Raluca every niece has rambled about her herself 'At Aunt Raluca's party, every niece rambled about herself.'

Item 12

Unambiguous Context:

Uncle Vlad a ținut o serată la un restaurant scump. Elena, Monica și Irina s-au bucurat să meargă.

'Uncle Vlad held a soirée at an expensive restaurant. Elena, Monica and Irina were happy to go.'

Ambiguous Context:

Bunica Laura a ținut o serată la un restaurant scump. Elena, Monica și Irina s-au bucurat să meargă.

'Bunica Laura held a soirée at an expensive restaurant. Elena, Monica and Irina were happy to go.'

GENDER GROUP	GENDER UNAMBIGUOUS
DISJ. (MASC. PRON.)	*La serata unchiului Vlad,* ***fiecare fată*** *s-a gândit la el.* at soirée Uncle Vlad every girl has thought about him 'At Uncle Vlad's soirée, every girl thought about him.'
REFL. (FEM. PRON.)	*La serata unchiului Vlad,* ***fiecare fată*** *s-a gândit la* ***ea****.* at soirée Uncle Vlad every girl has thought about her 'At Uncle Vlad's soirée, every girl thought about her.'

GENDER & FORM GROUP	AMBIGUOUS
AMBIG. (FEM. PRON.)	*La serata* ***bunicii Laura, fiecare fată*** *s-a gândit la* ***ea****.* at soirée Grandma Laura every girl has thought about her 'At Grandma Laura's soirée, every girl thought about her.'

FORM GROUP	FORM UNAMBIGUOUS
DISJ. (DEM.)	*La serata* ***bunicii Laura, fiecare fată*** *s-a gândit la* ***aceasta.*** at soirée Grandma Laura every girl has thought about this one 'At Grandma Laura's soirée, every girl thought about this one.'
REFL. (EMPH. REFL.)	*La serata* ***bunicii Laura, fiecare fată*** *s-a gândit la* ***ea însăşi****.* at soirée Grandma Laura every girl has thought about her herself 'At Grandma Laura's soirée, every girl thought about herself.'

Item 13

Unambiguous Context:

Unchiul George are o casă frumoasă. Monica, Irina și Elena au dorit să îi vadă biroul.

'Uncle George has a beautiful house. Monica, Irina and Elena wanted to see his office.'

Ambiguous Context:

Bunica Maria are o casă frumoasă. Monica, Irina și Elena au dorit să îi vadă biroul.

'Bunica Maria has a beautiful house. Monica, Irina and Elena wanted to see her office.'

GENDER GROUP	GENDER UNAMBIGUOUS
DISJ. (MASC. PRON.)	*În biroul unchiului George,* ***fiecare nepoată*** *a pălăvrăgit despre el.* in offce Uncle George every niece has jabbered about him 'In Uncle George's office, every niece jabbered about him.'
REFL. (FEM. PRON.)	*În biroul unchiului George,* ***fiecare nepoată*** *a pălăvrăgit despre* ***ea****.* in offce Uncle George every niece has jabbered about her 'In Uncle George's office, every niece jabbered about her.'

GENDER & FORM GROUP	AMBIGUOUS
AMBIG. (FEM. PRON.)	*În biroul* ***bunicii Maria, fiecare nepoată*** *a pălăvrăgit despre* ***ea****.* in offce grandma Maria every g-daughter has jabbered about her 'In Grandma Maria's office, every g-daughter jabbered about her.'

FORM GROUP	FORM UNAMBIGUOUS
DISJ. (DEM.)	*În biroul* ***bunicii Maria, fiecare nepoată*** *a pălăvrăgit despre* ***aceasta.*** in offce grandma Maria every g-daughter has jabbered about this one 'In Grandma Maria's office, every g-daughter jabbered about this one.'
REFL. (EMPH. REFL.)	*În biroul* ***bunicii Maria, fiecare nepoată*** *a pălăvrăgit despre* ***ea însăşi****.* in offce grandma Maria every g-daughter has jabbered about her herself 'In Grandma Maria's office, every g-daughter jabbered about herself.'

Item 14

Unambiguous Context:

Bunicul Radu are o grădină superbă. Irinei, Elenei și Monicăi le place să stea acolo.

'Grandpa Radu has a beautiful garden. Irina, Elena and Monica love being there.'

Ambiguous Context:

Mătușa Diana are o grădină superbă. Irinei, Elenei și Monicăi le place să stea acolo.

'Aunt Diana has a beautiful garden. Irina, Elena and Monica love being there.'

GENDER GROUP	GENDER UNAMBIGUOUS
DISJ. (MASC. PRON.)	*În grădina bunicului Radu, **fiecare fată** a istorisit despre el.* in garden grandpa Radu every girl story-told about him 'In Grandpa Radu's garden, every girl told stories about him.'
REFL. (FEM. PRON.)	*În grădina bunicului Radu, **fiecare fată** a istorisit despre **ea**.* in garden grandpa Radu every girl story-told about her 'In Grandpa Radu's garden, every girl told stories about her.'

GENDER & FORM GROUP	AMBIGUOUS
AMBIG. (FEM. PRON.)	*În grădina **mătușii Diana, fiecare fată** a istorisit despre **ea**.* in garden aunt Diana every girl story-told about her 'In Aunt Diana's garden, every girl told stories about her.'

FORM GROUP	FORM UNAMBIGUOUS
DISJ. (DEM.)	*În grădina **mătușii Diana, fiecare fată** a istorisit despre **aceasta.*** in garden aunt Diana every girl story-told about this one 'In Aunt Diana's garden, every girl told stories about this one.'
REFL. (EMPH. REFL.)	*În grădina **mătușii Diana, fiecare fată** a istorisit despre **ea însăşi**.* in garden aunt Diana every girl story-told about her herself 'In Aunt Diana's garden, every girl told stories about herself.'

Item 15

Unambiguous Context:

Bunicul Paul și-a serbat ziua de naștere. Irina, Elena și Monica au fost și ele prezente.

'Grandpa Paul celebrated his birthday. Irina, Elena, and Monica were also there.'

Ambiguous Context:

Mătușa Raluca și-a serbat ziua de naștere. Irina, Elena și Monica au fost și ele prezente.

'Aunt Raluca celebrated her birthday. Irina, Elena, and Monica were also there.'

GENDER GROUP	GENDER UNAMBIGUOUS
DISJ. (MASC. PRON.)	*La ziua bunicului Paul,* ***fiecare nepoată*** *a râs de el.* at birthday grandpa Paul every g-daughter has laughed at him 'At Grandpa Paul's birthday, every g-daughter laughed at him.'
REFL. (FEM. PRON.)	*La ziua bunicului Paul,* ***fiecare nepoată*** *a râs de* ***ea****.* at birthday grandpa Paul every g-daughter has laughed at her 'At Grandpa Paul's birthday, every g-daughter laughed at her.'

GENDER & FORM GROUP	AMBIGUOUS
AMBIG. (FEM. PRON.)	*La ziua* ***mătușii Raluca, fiecare nepoată*** *a râs de* ***ea****.* at birthday aunt Raluca every niece has laughed at her 'At Aunt Raluca's birthday, every niece laughed at her.'

FORM GROUP	FORM UNAMBIGUOUS
DISJ. (DEM.)	*La ziua* ***mătușii Raluca, fiecare nepoată*** *a râs de* ***aceasta.*** at birthday aunt Raluca every niece has laughed at this one 'At Aunt Raluca's birthday, every niece laughed at this one.'
REFL. (EMPH. REFL.)	*La ziua* ***mătușii Raluca, fiecare nepoată*** *a râs de* ***ea însăşi****.* at birthday aunt Raluca every niece has laughed at her herself 'At Aunt Raluca's birthday, every niece laughed at herself.'

Filler Items

Context: *Unchiul Vlad a organizat o reuniune de familie. Mihai, Daniel și Elena au ajuns mai devreme să îl ajute.*

'Uncle Vlad organized a family reunion. Mihai, Daniel, and Elena got there earlier to help out.'

Sentence: *Înainte de petrecere, ambii băieți s-au plâns despre prăjituri.*

'Before the party, both boys complained about the desserts.'

Context: *Mătușa Diana și-a scos nepoții la film. Apoi, Andrei, Monica și Irina au mers la ea acasă.*

'Aunt Diana took her nieces and nephews to the movies. Afterwards, Andrei, Monica, and Irina went by for a visit.'

Sentence: *După film, ambele fete erau încântate de performanța actorilor.*

'After the movie, both girls were delighted with thee actors' performance.'

Context: *Mătușa Raluca s-a dus la serbarea nepoților ei. Mihai, Irina și Elena merg la aceeași școală.*

'Aunt Raluca went to her nieces' and nephews' school festivitiees. Mihai, Irina, and Elena go to the same school.'

Sentence: *La serbare, toți elevii au discutat planurile lor pentru vacanță.*

'At the festivities, all of the students discussed their plans for the school break.'

Context: *Bunica Maria și-a invitat nepoții la ea. Daniel, Monica și Andrei vorbeau despre ceva.*

'Grandma Maria invited her grandchildren over. Daniel, Monica, and Andrei were talking about something.'

Sentence: *Bunica Maria a aflat că unii dintre nepoții ei cântă la chitară.*

'Grandma Maria found out that some of her grandchildren play the guitar.'

Context: *Unchiul Vlad era în grădină cu familia lui. Elena, Mihai și Irina discutau despre pasiunile lor.*

'Uncle Vlad was in the garden with his family. Elena, Mihai, and Irina were discussing their hobbies.'

Sentence: *Unchiul Vlad a auzit că ambele lui nepoate iubesc cărțile.*

'Uncle Vlad heard that both his nieces love books.'

Context: *Unchiul George voia idei de cadouri pentru familie. Daniel, Elena și Monica îi sugerau ce și-ar dori.*

'Uncle George wanted ideas for presents for his family. Daniel, Elena, and Monica were suggesting what they might want.'

Sentence: *Unul dintre nepoți i-a spus unchiului George că este interesat de chimie.*

'One of the nephews told uncle Goerge that he's interested in chemistry.'

Context: *Bunica Laura își încurajează mereu nepoții să învețe lucruri noi. Monica, Daniel și Irina îi spuneau ce au mai studiat.*

'Grandma Laura always encourages her grandchildren to learn new things. Monica, Daniel and Irina were telling her what else they've learned..'

Sentence: *Una dintre nepoate i-a zis bunicii Laura că a învățat un nou cântec.*

'One of the granddaughters told Grandma Laura that she learned a new song.'

Context: *Bunicul Radu a fost vizitat recent de familie. Mihai, Monica și Irina vorbeau despre examene.*

'Grandpa Radu was visited by his family recently. Mihai, Monica, and Irina were talking about exams.'

Sentence: *Doi dintre nepoții bunicului Radu erau mulțumiți de notele lor.*

'Two of grandpa Radu's grandchildren were happy with their grades.'

Context: *Bunicul Paul doar ce a împlinit 75 de ani. Andrei, Elena și Daniel au mers și ei să îl vadă.*

'Grandpa Paul recently turned 75. Andrei, Elena, and Daniel also went to see him.'

Sentence: *Doi dintre nepoții bunicului Paul au spus că îl admiră pe bunic.*

'Two of grandpa Paul's grandchildren said they admire grandpa.'

Context: *Mătușa Raluca are o livadă în afara orașului. Irina, Andrei și Monica merg des acolo.*

'Aunt Raluca has an orchard outside of town. Irina, Andrei, and Monica go their often.'

Sentence: *În livada mătușii Raluca, toți nepoții ei au vorbit despre ceilalți.*

'In aunt Raluca's orchard, all of her nieces and nephews talked about the others.'

Context: *Mătușa Diana a deschis accidental contul de Facebook al Irinei. Se uita la ce îi mai scrisese lumea pe pagină.*

'Aunt Diana accidentally opened Irina's Facebook account. She was checking what people had been writing on her wall.'

Sentence: *Pe pagina de Facebook a Irinei, Daniel a scris despre el.*

'On Irina's Facebook page, Daniel wrote about him.'

Context: *Mihai și Irina erau în camera lui Mihai. Irina i-a descoperit jurnalul.*

'Mihai and Irina were in Mihai's room. Irina found his diary.'

Sentence: *În jurnalul lui Mihai, Irina a citit despre Andrei.*

'In Mihai's diary, Irina read about Andrei.'

Context: *Bunicul Paul și bunica Maria au mers la serbarea Irinei. Monica s-a dus și ea cu ei.*

'Grandpa Paul and Grandma Maria went to Irina's school celebration. Monica went there, too.'

Sentence: *La școala Irinei, Monica a spus lucruri frumoase despre ea.*

'At Irina's school, Monica said nice things about her.'

Context: *S-a deschis o nouă casă de groază. Monica, Daniel și Elena au mers și ei.*

'A new haunted house opened. Monica, Daniel, and Elena went there too.'

Sentence: *În casa de groază, unul dintre copii a spus că îi e frică de vampiri.*

'In the haunted house, one of the kids said they're afraid of vampires.'

Context: *Bunicul Paul și-a invitat nepoții în biblioteca lui. Irina, Daniel și Andrei s-au bucurat să se ducă.*

'Grandpa Paul invited his grandchildren to his library. Irina, Daniel, and Andrei were glad to go.'

Sentence: *În biblioteca bunicului Paul, toți copiii au citit despre științe.*

'In grandpa Paul's library, all of the children read about science.'

Context: *Mihai, Monica și Andrei sunt la școală. Doar ce au aflat rezultatele de la un test.*
'Mihai, Monica, and Andrei are at school. They just found out about their test results.'
Sentence: *Examenul a fost foarte dificil, dar acum Mihai este mândru de nota sa.*
'The exam was really hard, but now Mihai is proud of his grade.'

Context: *Bunica Laura își cheamă des nepoții acasă. Daniel și Monica au dormit la ea.*
'Bunica Laura invites her grandchildren over often. Daniel and Monica slept over.'
Sentence: *Una dintre cele mai arzătoare dorințe ale Monicăi e să meargă la mare.*
'One of Monica's most burning wishes is to go to the seaside.'

Context: *O parte din familie s-a dus în vacanță. Andrei și Monica erau împreună la plajă.*
'A part of the family went on vacation. Andrei and Monica were at the beach together.'
Sentence: *A fost o iarnă foarte friguroasă, dar acum lui Andrei îi este dor de ea.*
'It's been quite a cold winter, but now Andrei now misses it.'

Context: *Irina și Elena au ieșit în oraș. Acum, fetele discutau despre ce mai aveau de făcut.*
'Irina and Elena went out. Now, the girls were talking about what else they had to do.'
Sentence: *Una dintre cele două fete este nemulțumită de lista ei.*
'One of the two girls is quite displeased with her to-do list.'

Context: *Bunica Laura a dat o petrecere aseară. Monica a rămas peste noapte.*
'Bunica Laura had a party last night. Monica stayed overnight.'
Sentence: *După petrecerea de ieri, Monica este supărată pe ea.*
'After yesterday's party, Monica is mad at her.'

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